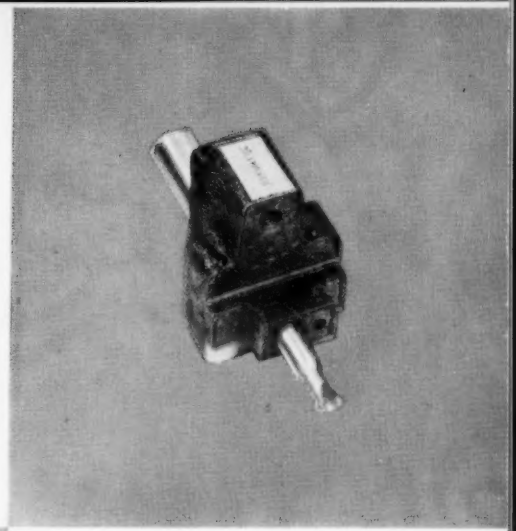
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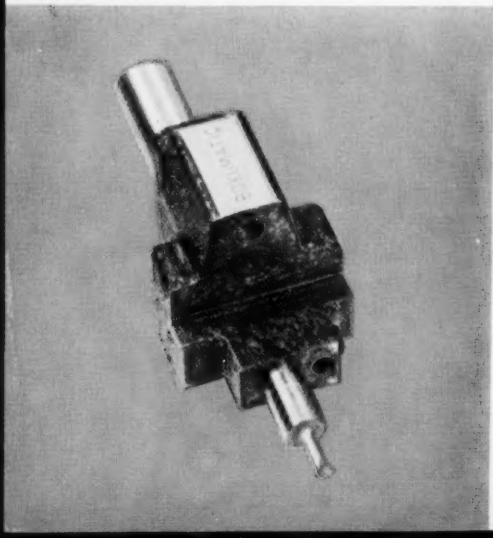
EXPLOSIVE METAL FORMING
See Page 163
HOW DISTRIBUTORS SERVE YOU
See Page 134

MAY 1959

NEW BOKUMETHOD

CUTS ACCURATE INTERNAL GROOVES





Bokum's new RT series—6 sizes in all—of recess tool holders has been especially designed for hand screw machines, turret lathes and multiple spindle automatic screw machines. The exclusive straight line dovetail motion gives accurate grooving dimensions. Use this Bokumethod . . . a Bokumatic RT holder with standard Bokum cutting tools . . . for "O" ring and retaining ring grooves, back chamfering, thread recessing and special internal forming. Write for complete information.

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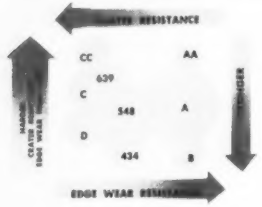
New! ADAMAS Grade Selection Chart

YOUR GUIDE TO PROPER GRADE SELECTION

MATERIALS

...ast Iron, Copper, Aluminum, Brass, Bronze, Magnesium, Molybdenum, Rubber, Fibre, Masonite, Wood Plastics, Zinc Alloys, Titanium and Titanium Alloys, Nimonic A, Ni-Hard, light cuts on 300 stainless steels Any material where feed of less than .005 is being used.	SAE 1000, 2000, and 8600 Series	SAE 3000, 4000 Series SAE 52100, Nitralloy, Monel, Inconel. Heavy cuts on Series 300 Stainless Steels. Series 400 Stainless Steels.
ADAMAS GRADE B, A, AA	**ADAMAS GRADE D, C, CC**	**ADAMAS GRADE 434, 548, 639***
ALSO USED TO MACHINE ANY MATERIAL WHEN EDGE WEAR IS THE PRIMARY PROBLEM.	**ALSO USED TO MACHINE ANY MATERIAL WHEN CRATERING IS THE PRIMARY PROBLEM.**	**ALSO USED TO MACHINE ANY MATERIAL WHEN BOTH EDGE WEAR & CRATERING ARE PROBLEMS.**

* Grade 639 stocked only in throwaways.



EXAMPLES

WHEN MACHINING A MATERIAL WITH GRADE A . . .

- If excessive edge wear occurs change to Grade AA.
- If chipping occurs change to Grade B.
- If cratering is excessive change to a steel cutting grade (probably Grade C).
- If both excessive edge wear and cratering occur switch to Grade 548.

WHEN MACHINING STEEL WITH GRADE C . . .

- If excessive edge wear occurs change to Grade CC.
- If chipping occurs change to Grade D.
- If cratering is excessive change to Grade CC.
- If both excessive edge wear and cratering occur switch to Grade 548.

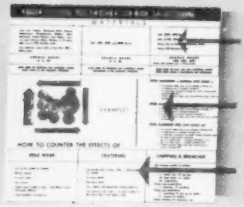
WHEN MACHINING STEEL WITH GRADE 548 . . .

- If excessive edge wear occurs change to Grade 639.
- If chipping occurs change to Grade 434.
- If cratering is excessive the grade change depends upon the type of steel being machined.
  (a) If a carbon steel — change to Grades C or CC.
  (b) If an alloy steel — change to Grade 639.
- If both excessive edge wear and cratering occur switch to Grade 639.

HOW TO COUNTER THE EFFECTS OF . . .

EDGE WEAR	CRATERING	CHIPPING & BREAKAGE
Use harder grade of carbide. Reduce speed. Increase feed. Use coolant. Check center height of tool — tool above center will cause rubbing. Check hardness of material.	Use harder and or more crater resistant grade of carbide. Increase speed. Decrease feed. Use coolant with good lubricating properties. Use positive rake tool — increase angle to decrease chip friction against tool.	Use stronger grade of carbide. Use negative rakes. Check tool design: (1) shank size (2) hp size (3) lead angle (4) radius (5) chipbreaker Check tool preparation: (1) brazing (2) grinding Check tool application: (1) overhang (2) tool not on center (3) amount of coolant Check machine for looseness, etc.

Designed to give you a practical guide to carbide grade selection and application.



Shows what grades to use on a wide range of materials . . . stainless steels, titanium, etc.

Quick reading diagram for fast grade reference.

Valuable application data on how to counter the effects of Edge Wear, Cratering, Chipping and Breakage.



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Please send me a copy of the new Adamas chart titled ***"Your Guide To Proper Grade Selection"***.

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contents

modern machine shop

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FEATURES IN THIS ISSUE

Forming	FACTS ABOUT EXPLOSIVE METAL FORMING *By Gilbert C. Close*	108
Management	HOW TO SOLVE YOUR SUPERVISORY PROBLEMS *By Alfred M. Cooper*	114
Welding	WELDING LOCOMOTIVE TRACTION MOTOR FRAMES *By H. E. Schneider*	116
Machine Design	DESIGN FACTORS AFFECTING MACHINE EFFICIENCY *By Kurt O. Tech*	120
Tool Distribution	DISTRIBUTOR SERVICE IS KEY PRODUCTION AID *By Lyman H. Bellows*	130
Distributor Service	THE DISTRIBUTORS' "SELF IMPROVEMENT" PROGRAM *By John N. Failing*	138
Automation	IN-LINE AUTOMATION OF TRANSMISSION NERVE CENTER	144
Grinding	ELECTROLYTIC GRINDING REDUCES PRODUCTION COSTS	148
Drilling	CARRIAGE-MOUNTED DRILL PRESS SHORTENS DRILLING TIME	150
Boring	UNIQUE ARRANGEMENT SOLVES BORING PROBLEM	154
Machining	AUTOMATIC MACHINING METHOD MINIMIZES SHAFT LENGTH	156
Fastening	STEP BLOCKS AND CLAMPS MINIMIZE SET-UP TIME	158
Lubrication	SELF-LUBRICATING FOLLOWER REST *By Harold Sedlik*	162
Fixtures	CUTTING TOOL GRINDING FIXTURE *By Roger Isetts*	162
Clamping	DOUBLE VISE SETUP FOR DIFFICULT-TO-HANDLE WORK *By H. J. Gerber*	164

DEPARTMENTS

IMPORTANT MEETING DATES	64	FREE LITERATURE	166
ADVERTISING REPRESENTATIVES	101	NEWS OF THE INDUSTRY	182
OVER THE EDITOR'S DESK	102	NEW SHOP EQUIPMENT	187
PRODUCTION THRU MODERNIZATION	144	WHERE TO GET IT	278
IDEAS FROM READERS	162	INDEX TO ADVERTISEMENTS	286



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modern machine shop

features in

Assembling & Finishing... Inspecting, Testing & Control... Press Working... Management & Safe Practices... Materials & Processes... Production Machining... Tooling & Design

FACTS ABOUT EXPLOSIVE METAL FORMING

By Gilbert C. Close



MMS Field Editor Close recently visited the Aerojet-General Corporation in Azusa, California, to obtain the "low down" on the research work now being conducted by this missile producer's Explosive Ordnance Division on the new, revolutionary process of explosive metal forming which shows a brilliant future in space age production.

Page 108

HOW TO SOLVE YOUR SUPERVISORY PROBLEMS

By Alfred M. Cooper

Questions and answers pertaining to labor turnover problems are the subject of Mr. Cooper's column this month. Do you have a particular supervisory problem? If so, send information on same to Mr. Cooper in care of this magazine.

Page 114

WELDING LOCOMOTIVE TRACTION MOTOR FRAMES

By H. E. Schneider

The plant manager of Plant Number 2, Electro-Motive Division, General Motors Corporation, Chicago, Illinois, discusses the equipment used and outlines the operations performed in his plant in producing weldments from heavy rolled steel sections for subsequent use as frames for electric traction motors for locomotives.

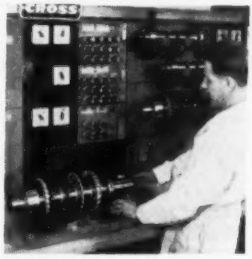
Page 116

this issue

MAY 1959 · VOL. 31 · NO. 12

DESIGN FACTORS AFFECTING MACHINE EFFICIENCY

By Kurt O. Tech



In the preparation of a plan for an automatic machining operation, the amount of attention that is given to the following two specific areas plays an important part in determining the efficiency of the completed production facility: (1) processing the parts to be manufactured for optimum efficiency and economy consistent with production and quality requirements; and (2) the selection of machine tool and allied equipment to satisfy known requirements.

Page 120

DISTRIBUTOR SERVICE IS KEY PRODUCTION AID

By Lyman H. Bellows

"The industrial distributor is as near as the phone, ready to assist with merchandise or advice. It will pay you to know him better." So says the President of American Supply and Machinery Manufacturers' Association, Incorporated.

Page 130

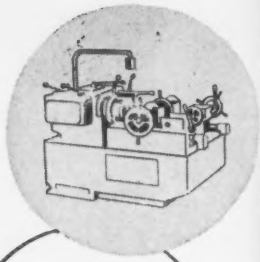
THE DISTRIBUTORS' "SELF IMPROVEMENT" PROGRAM

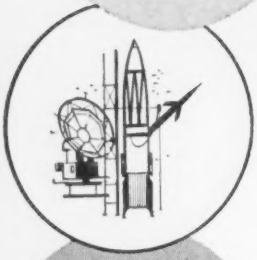
By John N. Failing

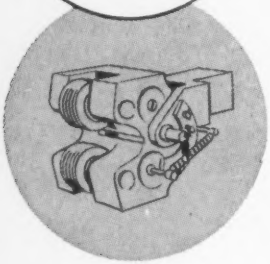
The President of the National Industrial Distributors' Association discusses a large scale program aimed at maintaining distributor function with a diminution of expense.

Page 138

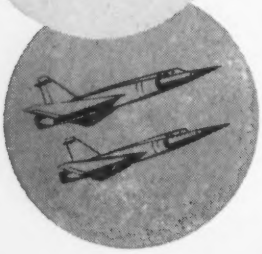
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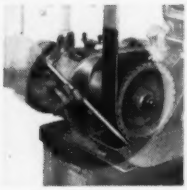
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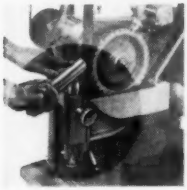


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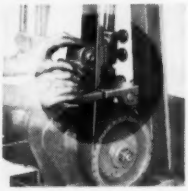
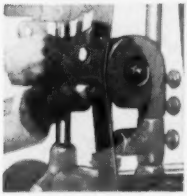


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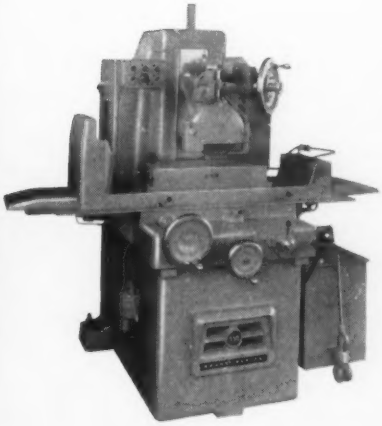
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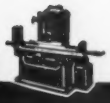
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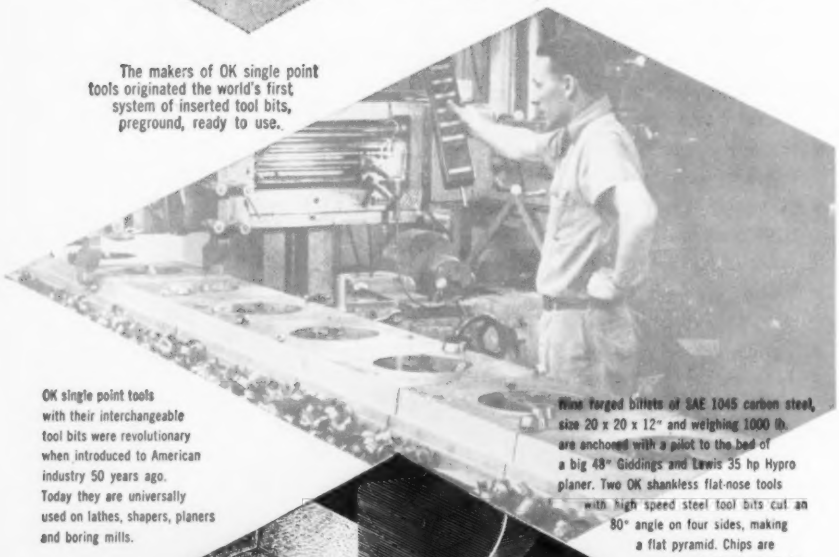
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How Bullard with two **OK** Man-au-trol turret heads are gang-planed

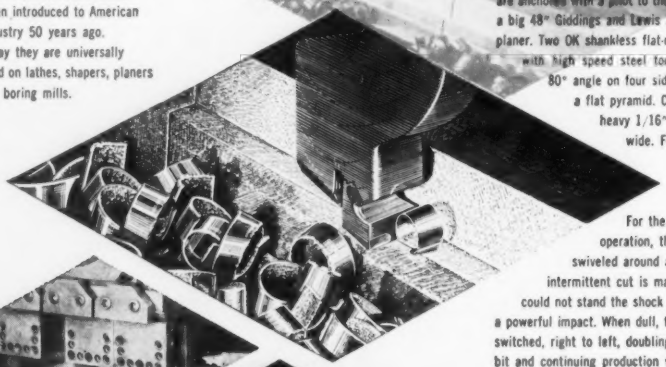
single point tools

The makers of OK single point tools originated the world's first system of inserted tool bits, preground, ready to use.



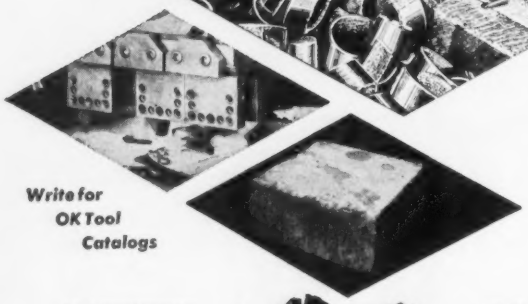
OK single point tools with their interchangeable tool bits were revolutionary when introduced to American industry 50 years ago. Today they are universally used on lathes, shapers, planers and boring mills.

Nine forged billets of SAE 1045 carbon steel, size 20 x 20 x 12" and weighing 1000 lb. are anchored with a pilot to the bed of a big 48" Giddings and Lewis 35 hp Hypro planer. Two OK shankless flat-nose tools with high speed steel tool bits cut an 80° angle on four sides, making a flat pyramid. Chips are heavy 1/16" depth, 3/4" wide. Feed, 40 ft/m.

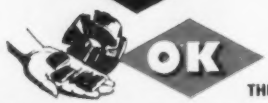


For the second operation, the blocks are swiveled around and a rugged intermittent cut is made. Carbide could not stand the shock of such a powerful impact. When dull, tool bits are switched, right to left, doubling to life of the bit and continuing production with the minimum of downtime.

OK tools are built for heavy machining. Holders are tough forgings. For tool bits, you have a choice of high speed steel, cobalt, Vasco Supreme and carbide.



Write for OK Tool Catalogs



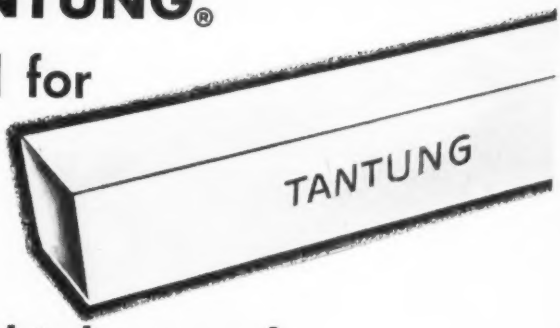
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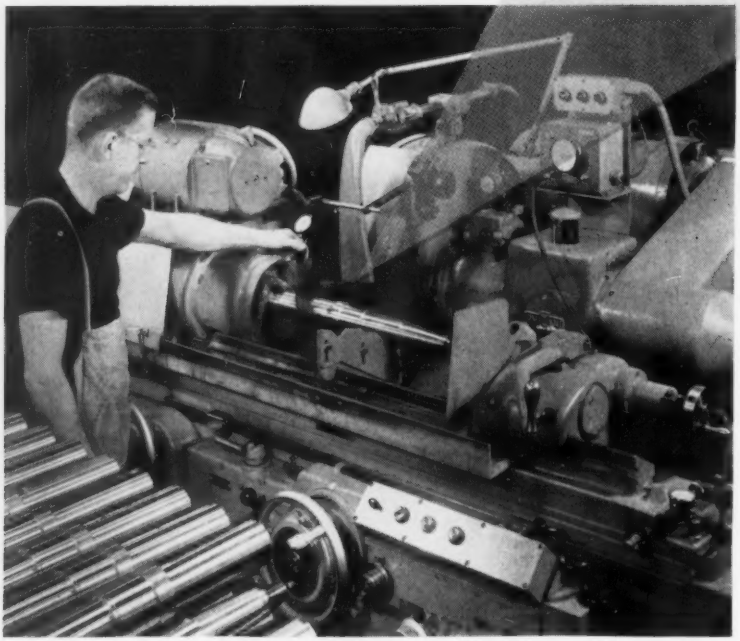
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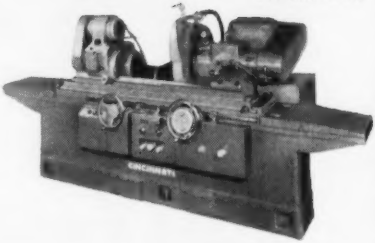
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...and for GRINDING THE CENTER



Cincinnati's automatic infeed grinding cycle and automatic gap eliminator are deciding factors in reducing the cost of grinding precision multiple diameter shafts. A CINCINNATI FILMATIC 10"R x 36" Plain Grinder performs the various operations.

CINCINNATI



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SECTION

CINCINNATI'S Automatic Features ARE ADDITIONAL TIMESAVERS

Multiple diameter shafts and multiple operations are often inseparable. The shafts being ground on the CINCINNATI FILMATIC 10"R Plain at the left are typical examples. They require three types of setups: straight traverse, taper traverse, and infeed. The center section is the infeed operation, with a 4" wide wheel. Two automatic features keep costs down:

1) push-button automatic infeed
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Many additional advantages are offered by Cincinnati for grinding multiple diameter work, or any other work within the range of the machine. A simple cost analysis . . . your present equipment vs. a new CINCINNATI . . . can be most revealing. Write for catalogs G-661-1 and G-660-2 to help in making a comparison.

FILMATIC 10"R PLAIN HYDRAULIC GRINDING MACHINE

Complete range and sizes:

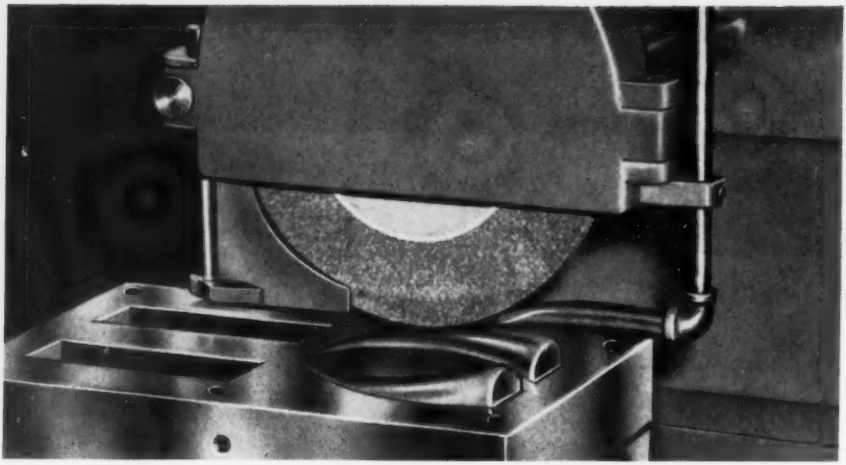
Size	Between-Center Lengths	Catalog
6"R 10"L	18" and 30"	G-660-2
10"R 14"L	18", 36", 48" 72" and 96"	G-661-1

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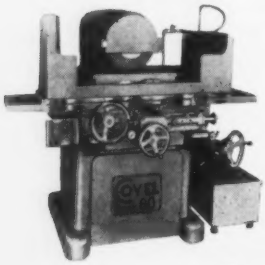
Micro-precision extended for years

ON EVERY COVEL TOOL-ROOM SURFACE GRINDER

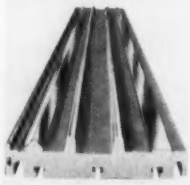
Grinding plastic mold dies like this calls for MICRO-PRECISION . . . and the 14″ x 24″ Covel "60" has it! Also accurately grinds trim, forming. blanking and die-casting dies in addition to jigs, fixtures, dovetail and flat form tools. Ideal for high speed or carbide production parts grinding, too. Covel precision grinders save you money because they give new-machine performance longer—stay "front-and-center" in your tool-room grinder lineup for years and years of MICRO-PRECISION performance. That's because Covel-pioneered features preserve new-machine accuracy longer—for example, hard chrome table ways maintain built-in accuracy far beyond the life of ordinary ways. Before you buy your next surface grinder, it will pay you to learn all the facts about this and other Covel advances.

First with hard chrome table ways . . .

Micro-Precision a Covel Tradition-Since 1874



Send today for your copy of "The Covel Precision Story" and complete data on the Covel Surface Grinder that meets your needs — seven sizes from 6″ x 12″ to 16″ x 36″. Ask for Bulletin M-59.



COVEL ***PRECISION GRINDERS***

BENTON HARBOR, MICHIGAN

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One

PROFIT PICTURE

after another

—with

SPIRAL POINT*

That's because Spiral Point transforms a standard twist drill into a cost-reducing, precision tool!

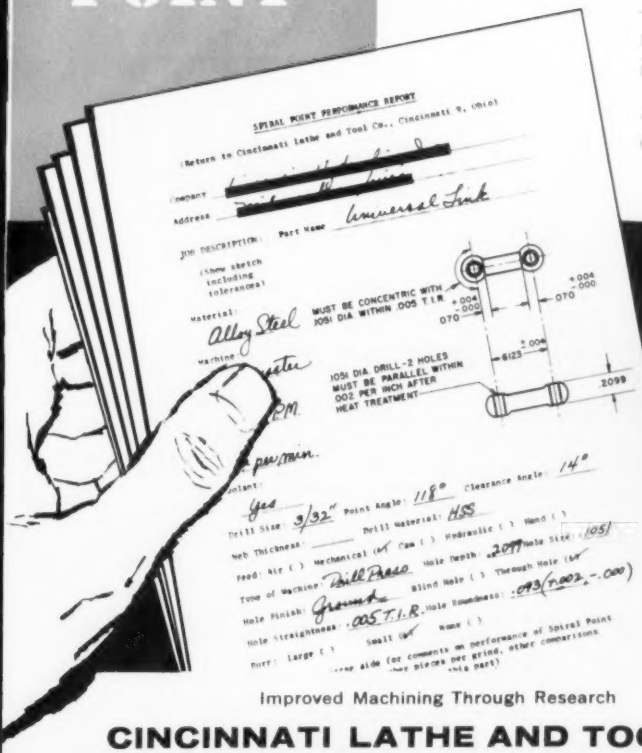
On this Link, a manufacturer of hydraulic equipment ELIMINATED TWO MACHINING OPERATIONS—the result of Spiral Point's self-centering action!

Previous method required spot milling, drilling and reaming undersize, then a final grind after heat treatment.

A Spiral Point drill grind of 118° point angle held tolerances consistently, leaving only finish grinding.

Convert the twist drills in your plant to precision Spiral Points with the Cincinnati SPIROPOINT® DRILL SHARPENER —automatically applies this new point geometry in a matter of seconds.

Ask your CL&T Dealer, or write us direct.



*Cincinnati's new drill point geometry. You get accurate hole size—straighter, rounder, cleaner holes; eliminate secondary operations; maintain hole-positioning accuracy without costly guide bushings or pre-centering; get more holes per grind.

Improved Machining Through Research

CINCINNATI LATHE AND TOOL CO.

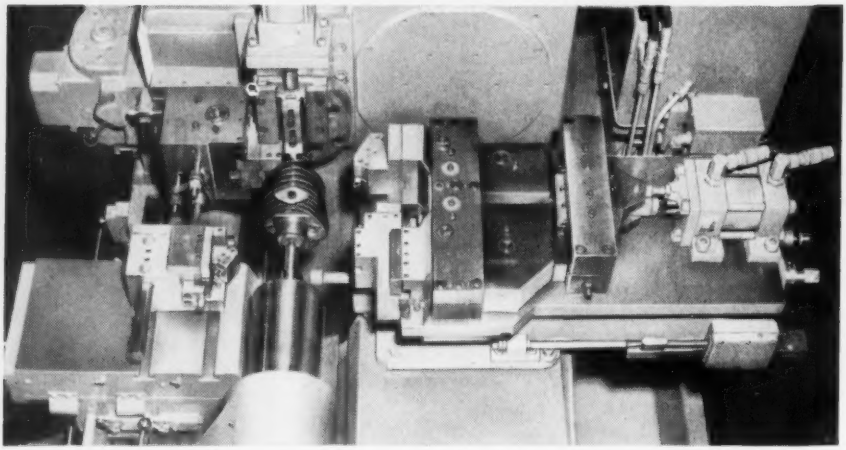
3210 Disney Street • Cincinnati 9, Ohio

"TRAY-TOP" Lathes • "CINCINNATI" Drilling Machines
"SPIROPOINT" Drill Sharpener

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Six different sizes and types of workpieces are handled easily on this job. Extra expanding mandrel and sleeves at right are for different sizes.



How Harley-Davidson speeds motorcycle part production

Machines both ends in single chucking, using Gisholt No. 12 Automatic to get maximum accuracy, cut production costs

This well-planned setup reveals how Harley-Davidson Motor Co., Milwaukee, Wis., is handling cast iron front and rear cylinders.

Smart tooling on a Gisholt MASTERLINE No. 12 Automatic Production Lathe handles 6 different sizes and types of workpieces. Change-over is fast and easy. A special headstock-mounted, air-operated locating stop speeds work handling.

While tools in the front carriage turn and chamfer at one end of the piece, tools in a headstock-mounted auxiliary slide chamfer the I.D. on the other side. Simultaneously, tools on the rear slide face both ends for length. At the end of the cut, tool blocks on the rear independent slide swing open automatically to provide tool relief before withdrawal. Floor-to-floor time on the part shown is 1.2 minutes, only 1.8 to 3.6 minutes for the other 5 workpiece types and sizes.

The new Gisholt MASTERLINE No. 12 Automatic Production Lathe is designed specifically for high production operations; yet, it is flexible enough to handle a variety of similar parts in small repeat lots. The automatic cycle frees the operator to handle other machines or do other work.

Make a note to phone your Gisholt Representative today. Ask him to come in and show you where the fast automatic cycle and flexibility of the No. 12 Automatic Production Lathe can cut your floor-to-floor time and reduce your costs.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

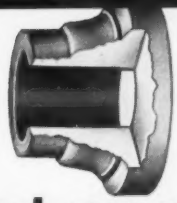
Madison 10, Wisconsin, U.S.A.

WRITE GISHOLT TODAY for advance data on the new Gisholt MASTERLINE No. 12 Automatic Production Lathe. Ask for Form 1178.

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE

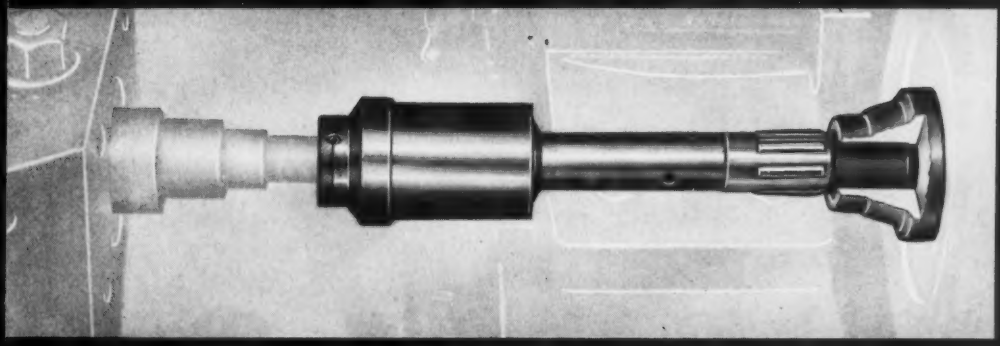
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from 125 to 5 micro-inches



surface finish

in one 5-second pass!



with the revolutionary microller® *burnishing tool*

- Finishes roughest bored or turned surfaces (ie: 200 mu-in. and higher) to finishes of 4 micro inches and lower.
- Finishes in one pass at feed rates of 8 to 12 inches per minute. A one inch length in 5 seconds!
- Finishes all machineable metals . . . all types of surfaces; internal and external cylindrical . . . tapered, radial, flat.
- Use tool in any machine . . . on any drill press, engine or turret lathe as a secondary operation . . . or right on the screw machine or automatic where other operations are performed! No special equipment needed.

ADJUSTABLE FOR SIZE CONTROL

- Sizes in increments of .000025" or less . . . performs sizing operations never before possible. Invaluable for sizing bearing seats, oilite bushings, parts out of tolerance, etc.
- Run thousands of parts without tool wear. No stones to replace. Highly hardened rolls and tip last for thousands of parts. Tool maintains size setting . . . no adjustment necessary. Wearing parts replaceable. Simplest setup and operation . . . no skill required.
- Stock shipment in popular sizes. Tools and replacement parts available from stock for off-the-shelf delivery.
- Refined, improved surface, a new concept. Tool marks and surface imperfections are rolled out. Grain structure is condensed and compacted . . . workhardened and refined; fatigue properties are improved. An ideal, wear-resistant, surface results . . . free of damaging abrasive grit inherent in honing or grinding.
- The top twenty companies in the metal working field . . . plus more than a thousand others have replaced costly finishing and sizing methods with the Microller burnishing tool. In actual case histories, finishing costs have been cut by 90% . . . production rates increased by eight and nine times.
- Results guaranteed: The Microller is backed by Madison-Faessler's 80 years of experience in producing cold rolling tools . . . and is sold on a results guaranteed basis. Sales and service representatives in all principal cities.

Write for further information

MADISON-FAESSLER TOOL CO.
Dept. M5, P.O. Box 1137, Providence, R. I.

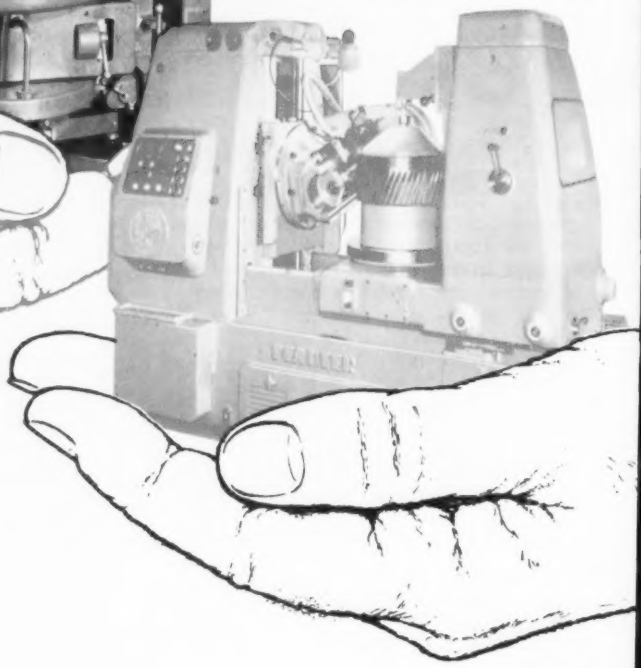
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PERFECT COMPLEMENTS . . .



Fellows 36-Type
Gear Shaper



Pfauter P 400
Gear Hobbing Machine

THE
PRECISION
LINE

. . . ✓ FELLOWS GEAR SHAPERS!
✓ PFAUTER GEAR HOBBERS!

Now Fellows sells, and later will manufacture, the world-famous Pfauter Gear Hobbing Machines and Worm Milling Machines.

Fellows Gear Shapers and Pfauter Gear Hobbers provide complete coverage of modern gear production equipment needs. Both operate on the molding-generating principle. The Pfauter Hobbers embody every important advance in hobbing technique, in most cases originated by Pfauter. And Fellows Gear Shapers incorporate every major advance in gear production by the Gear Shaper method originated by Fellows.

Among the many features incorporated in Pfauter Hobbers are the differential for helical gear hobbing, the hydraulic backlash eliminator for efficient climb hobbing, the fully automatic plunge for longitudinal and radial-tangential hobbing and, most recently, exclusive Pfauter DIAGONal Hobbing. Capacities of Pfauter machines range from 3" max. P. D., 2¾" max. face width, to 120" max. P. D., 1¼ D. P. and 30" max. face width.

With the addition of the Pfauter line, Fellows provides the most comprehensive service possible in the field of gear production equipment. Your Fellows representative can give you full information about our machines and instruments which cover every phase of gear production.

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Branch Offices: 1048 North Woodward Avenue, Royal Oak, Mich.
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Fellows *Gear Production Equipment*

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For fast, economical cutting of flat metal shapes there are

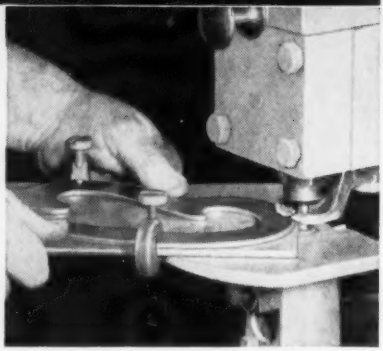
7 MODELS OF Campbell Nibbling Machines

...with cutting capacities ranging from 3/32″ mild steel for **MODEL 0** machine to 1/2″ mild steel for **MODEL 530**, in sheet sizes from 16″ or less, to 72″.

CAMPBELL NIBBLERS are making tremendous savings in time and money for hundreds of users in aircraft and other metal-working plants.

...in fast cutting of ferrous and non-ferrous sheet metals or composition sheets.

...for moderate production runs or experimental development work.





Economical "throw-away" punch and die

• CAMPBELL NIBBLERS cut from 40 to 60 times faster than drilling or filing. A fast-moving punch (350 to 900 strokes per minute) operating over a die, nibbles out the design, taking a small "bite" with each stroke of the punch.

...for any and all kinds of shapes

...for either inside or outside cuts

...with no distortion of material—no internal strains —no invisible fractures—no burr

...with a "nibbled" edge that is sufficiently smooth to require very little finishing and sometimes none

CAMPBELL standard punches are made double end to double work life and halve the cost. Prices are so low (starting at 40c each, or 20c per working end) that new punches cost less than regrinding dull ones.

Here is a quick picture of CAMPBELL NIBBLING MACHINE Capacities

Campbell Nibbler Model#	Sheet Width	WORKING CAPACITY Sheet Thickness Mild Steel	Alloy Steel	Strokes per Minute
0	16″	3/32″	1/16″	900
1A	20″	3/16″	1/8″	375-650
430	60″	3/8″	1/4″	350-525
436	72″	3/8″	1/4″	350-525
530	60″	1/2″	5/16″	350-525
2524	48″	1/4″	3/16″	375-650
2536	72″	1/4″	3/16″	375-650



Send for this catalog for complete information on this versatile production and experimental tool

CAMPBELL NIBBLERS

Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

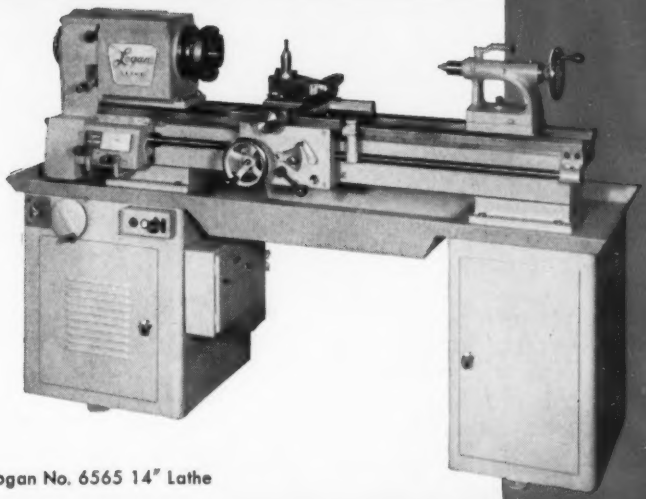
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ACCO

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its specifications add up
to high production capacity

Logan
14" Lathe



Logan No. 6565 14" Lathe

Logan designs greater reliability and accuracy, and longer life into its lathes by a generous combination of high-capacity features. For instance—

- An oversize spindle with 1⅝" bore turns on four super-precision ball bearings with built-in preload
- A variable-speed drive lets you change speed while work is turning—without shifting belts
- A warp-free lathe bed with high, strong walls braced by oversize ribs to withstand heaviest stresses; two V-ways and two flat ways are flame-hardened and precision-ground.

There are many more reasons why this and other Logan Lathes have a greater capacity. The complete specifications tell the story. Write for them.

- Spindle speeds to 2000 rpm
- 1½" Levermatic collet chuck capacity
- 14⅜" swing over bed
- 9" swing over saddle cross slide
- 40" between centers

LOGAN ENGINEERING CO. Dept. L-559, 4901 Lawrence Avenue, Chicago 30, Illinois
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ONLY the NEW MARVEL NO. 81A
High Speed HEAVY DUTY Band Saw can cut miters AUTOMATICALLY



The unequalled versatility, speed, and accuracy of the MARVEL No. 81A Heavy Duty Universal Hydraulic Band Saw, equipped with Shuttle Type Automatic Bar Feed, makes it the only truly multi-purpose production band sawing machine on the market. There are many jobs in metal sawing that *only* the MARVEL No. 81A can do.

For example, take automatic miter cutting. The vertical column (which travels forward to feed the blade through the fixed work) can be tilted up to 45° right or left of vertical. Work of any length can be laid directly on the machine (with no overhead interference) or positioned longitudinally on the roller tables by means of manual power control of the shuttle bar feed.

Feed pressure, blade speed, and length gauge can be set—or changed instantly, even during the sawing operation. The machine will make repetitive angular cuts (or square cuts) automatically without operator attention, with length accuracy held to .005" until the stock is used up.

The exclusive MARVEL "Sure-Line" Automatic Blade Control continuously senses and automatically corrects any tendency of the blade to drift off-line, insuring accuracy of cut.

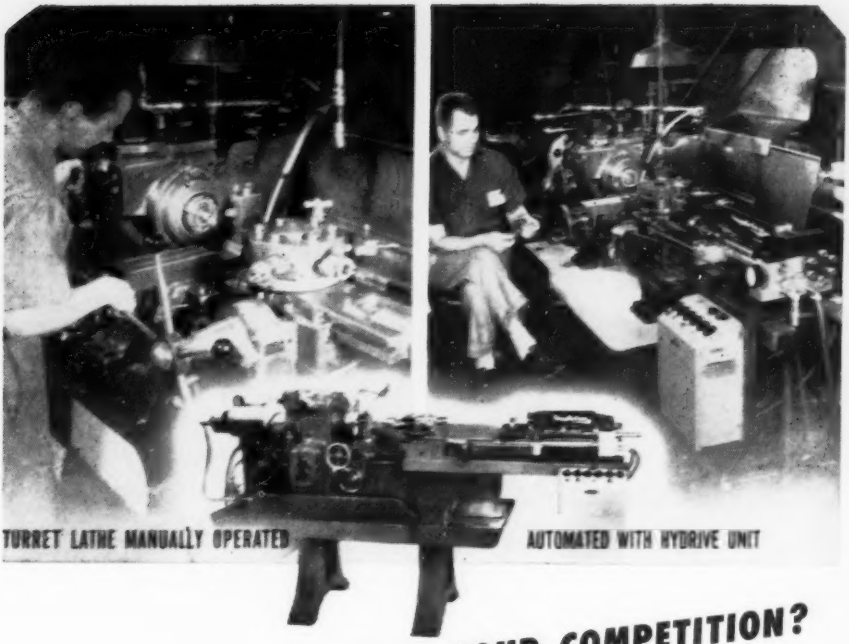
The new MARVEL No. 81 and 81A Series Band Saws—(capacity 18" x 20") are the most advanced band sawing machines on the market. Before you buy *any* saw, see the MARVEL No. 81 Series.

Write for illustrated catalog and full details.

ARMSTRONG-BLUM MFG. CO.
5700 W. BLOOMINGDALE AVENUE
CHICAGO 39, ILLINOIS

Metal Cutting MARVEL SAWS
Better Machines—Better Blades

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CAN YOU MEET OR BEAT YOUR COMPETITION?

Comparison tests between Hydrive and manually operated turret lathes prove Hydrive superiority and speed

However, quality and precision are much more than secondary considerations. With Hydrive's hydraulically constant pressures any lateral dimension required can be maintained accurately. And with identical pressures pre-set into any production run, Hydrive will produce first and last pieces exactly the same. This consistency gives you less waste, less operator fatigue, and more inspection time. . . . Acme Hydrive will adapt to turret lathes from bench sizes to No. 5 and automatically operate the turret. Acme can automate the following functions: the cross slide, change spindle speed, advance bar stock, reverse direction of spindle rotation for tapping, and open and close collet and control them automatically with Hydrive.

For further information check this coupon. Also check for free showing of the Acme Hydrive film.

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☐ Make arrangements for us to see your Hydrive film.

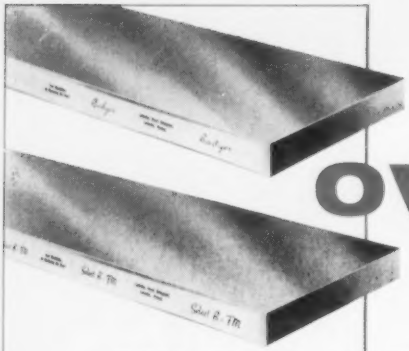
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OVERSIZE: .010" to .012" on thickness

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(Standard tolerances on 1 3/64" thickness and under)

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Latrobe's OVERSIZE Flat Ground Die Stock facilitates die production by permitting design and layout to nominal dimensions—with "extra thousandths" for grinding to nominal size after heat treatment.

Latrobe's OVERSIZE Flat Ground Stock is furnished with precision-ground surfaces in 18 and 36 inch lengths. Grade is identified over entire length of bar. Over 750 sizes of O-1 type Badger and 125 sizes of A-2 type Select B FM!

Call Latrobe today—
Or, send for Bulletin P-8-9-243

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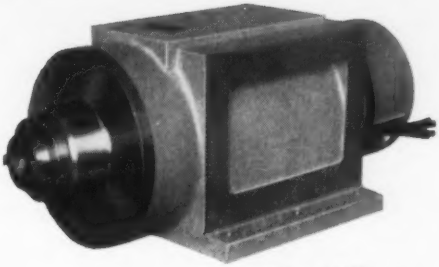
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These Heavy Duty, High Speed Milling Spindles can be furnished in a wide variety of horsepowers and speeds, ranging from ½ h.p. to 100 h.p. and from 3600 r.p.m. to 60,000 r.p.m. They are unequalled for long life, trouble-free operation and rugged ability to cut metal fast.

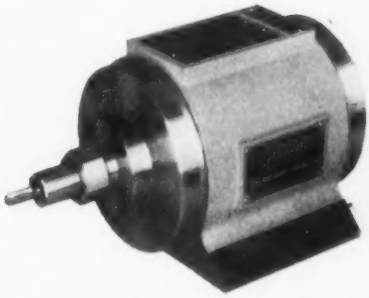


20 h.p. at 7200 r.p.m.
40 h.p. at 14,400 r.p.m.

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15 h.p. at 14,400 r.p.m.



2 pole — 4 pole motor
½ h.p. at 6000 r.p.m.
¾ h.p. at 12000 r.p.m.
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POPE designs and builds special High Frequency Spindles for a great range of applications. For recommendations and quotations, let us have your specifications.

No. 97

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by ALL who use it

6 x 12 SURFACE GRINDERS

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BIG Machine Performance—small machine cost . . . Boyar-Schultz 6 x 12 Surface Grinder is designed for very close tolerance work and built with extra sturdiness to maintain that precision quality through a long life.

If your need is for extreme accuracy in a grinder that will accommodate as much as 80% of the work in the tool room . . . this is your best buy! We find this grinder is also used to great advantage in the production line. Write, wire or call us. We'll be glad to SHOW you what this fine grinder can do for you.

BOYAR-SCHULTZ CORPORATION

2020 SOUTH 25TH AVENUE • BROADVIEW, ILLINOIS

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Gisholt Factory-Rebuilt 2L
Saddle Type Turret Lathe



you can cut your costs with
GISHOLT FACTORY-REBUILT LATHES

Is lack of capital forcing you to rely on old, worn-out lathes that slow production, skyrocket costs and up your reject rates? Then here's the answer to your problems. YOU CAN GET ORIGINAL ACCURACY AND PERFORMANCE with a Gisholt Factory-Rebuilt Lathe FOR LITTLE MORE THAN HALF THE COST OF A CURRENT MODEL!

Several Plans Are Available—you can purchase a factory-rebuilt lathe outright, trade in your old Gisholt Lathe as a part of the rebuilt's purchase price, or have your old Gisholt Lathe rebuilt at the factory. You can also take advantage of Gisholt's liberal Time-Payment or Leasing Plans.

Modern Features Added—in many cases cost-cutting improvements such as automatic drives for ram type turret lathes, JETracers for ram and saddle type turret lathes and automatic lathes, can be added to your rebuilt lathe for even greater production efficiency.

Guaranteed by Gisholt—all Gisholt Rebuilts are guaranteed to equal original performance, accuracy and appearance for a full year—THE SAME GUARANTEE AS ON BRAND-NEW MODELS!

Ask your Gisholt Representative or mail the coupon for a free booklet—"Rebuilding Service Makes Old Machines Like New."

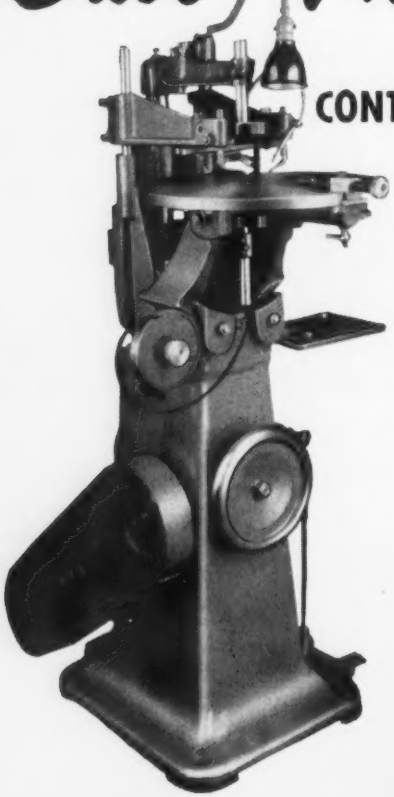
GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Gisholt Machine Company
Madison 10, Wisconsin
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☐ Please have representative call.
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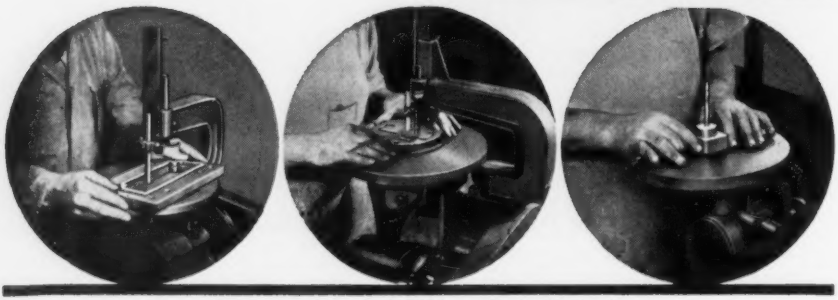
Save Hours in tool rooms and die shops with CONTOUR SAWING AND FILING



You can save real time and money in the production of parts for jigs and fixtures, dies, gages, templates and special machine production by using an Oliver of Adrian contour sawing and filing machine.

The Oliver is so simple to operate that all sawing, filing and lapping can be handled by an ordinary mechanic—saving a skilled die maker's costly time. Parts can be shaped to dimension faster, more accurately with no hand filing or semi-finishing operations. Available in five types – bench or pedestal. Write today.

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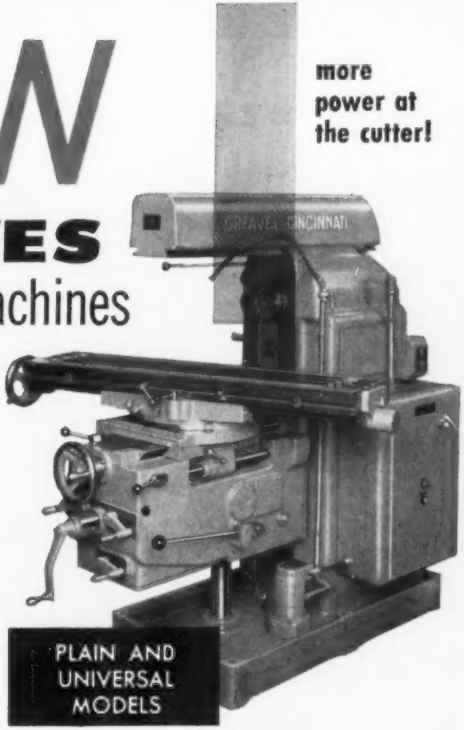


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new

GREAVES
2-XH Milling Machines

more power at the cutter!



PLAIN AND UNIVERSAL MODELS

The completely new GREAVES No. 2-XH Milling Machine brings added versatility, increased operational ease, and more power where it's needed most . . . *at the cutter!*
It utilizes two motors, one for spindle drive; a separate motor for moving table, saddle and knee. Compare this and the other outstanding features of the new Greaves Mill. You'll see why Greaves is "The MOST Mill for the LEAST Money."

Write for detailed literature!

- Wide range of speed/feed combinations for any type material, any type job.
- Heavy, internally ribbed column casting and heavy duty rectangular overarm for maximum rigidity.
- Large, heavy-duty knee, saddle and table provide accuracy for all types of milling.
- New 7½ HP spindle drive motor, with separate motor for movable components, provides extra power for heavy milling.
- Easy-to-reach controls. Handwheels and vertical crank disengage automatically when not in use.
- New rapid traverse lever within operating control area.
- Separate drive motor for table, saddle and knee provides more smooth balanced power at the cutter.

GREAVES
MACHINE TOOL DIVISION

J. A. FAY & EGAN COMPANY
2700 Eastern Avenue, Cincinnati 2, Ohio

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How Allison Wheels help you get

Quick, Accurate Cuts on Any Material, Any Shape

• Abrasive cutting can give you *cleaner* cuts, *faster*—on almost any material from titanium to fire brick. But only with the proper cut-off wheel can you get best results. That's where your ALLISON-CAMPBELL Field Engineer can help. He can select the ALLISON wheel to cut metals and other hard materials at speeds of just a few seconds per square inch—fine finish, no burn, with little or no burr—accuracy within close tolerances. There's an ALLISON wheel for every abrasive cutting job.

Resinoid bonded wheels • for dry abrasive cutting at speeds of 3 to 5 seconds per sq. in. **Rubber bonded wheels** • for wet cutting of all types of steel, alloys, titanium, glass, plastics. **Masonry cutting blades, including reinforced types** • for wet and dry cutting of fire brick, concrete block, tile, other building materials. **Fiberglass reinforced wheels** • for extra strength on many foundry jobs.

GET THE COMPLETE STORY! • Write for **Bulletin DH-214** for detailed information on abrasive cutting and wide selection of ALLISON wheel specifications. ALLISON wheels available 3″ to 34″ diameter, .006″ to 3/16″ thick. And remember—your ALLISON-CAMPBELL Field Engineer can give you specialized help. Specify ALLISON wheels for efficient, accurate, economical cutting.

ACCO **ALLISON** ABRASIVE CUTTING **WHEELS**

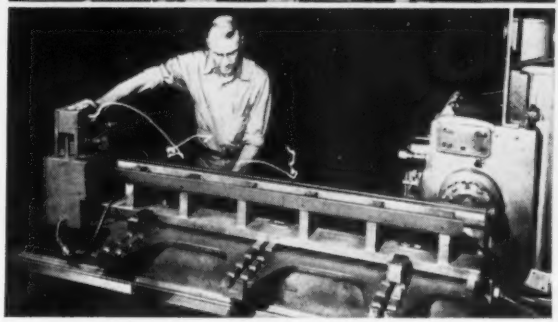
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MAJOR TIME SAVINGS

...result from shift to magnetic clamping





Wrist lights tell the story in these two photos. The job is the same—only the clamping method changes. Note how the excessive motion required with mechanical clamping (top view) is eliminated with the change to Sundstrand magnetic clamping (lower view).

Longer tool life, greater clamping uniformity, and a significant reduction in operator fatigue are a few of the outstanding benefits you are sure to get with magnetic clamping. A quick check on its application to your jobs will show you others.



FREE DATA about Sundstrand magnetic clamping fixtures is available in Bulletin A-553. Write for your copy today.

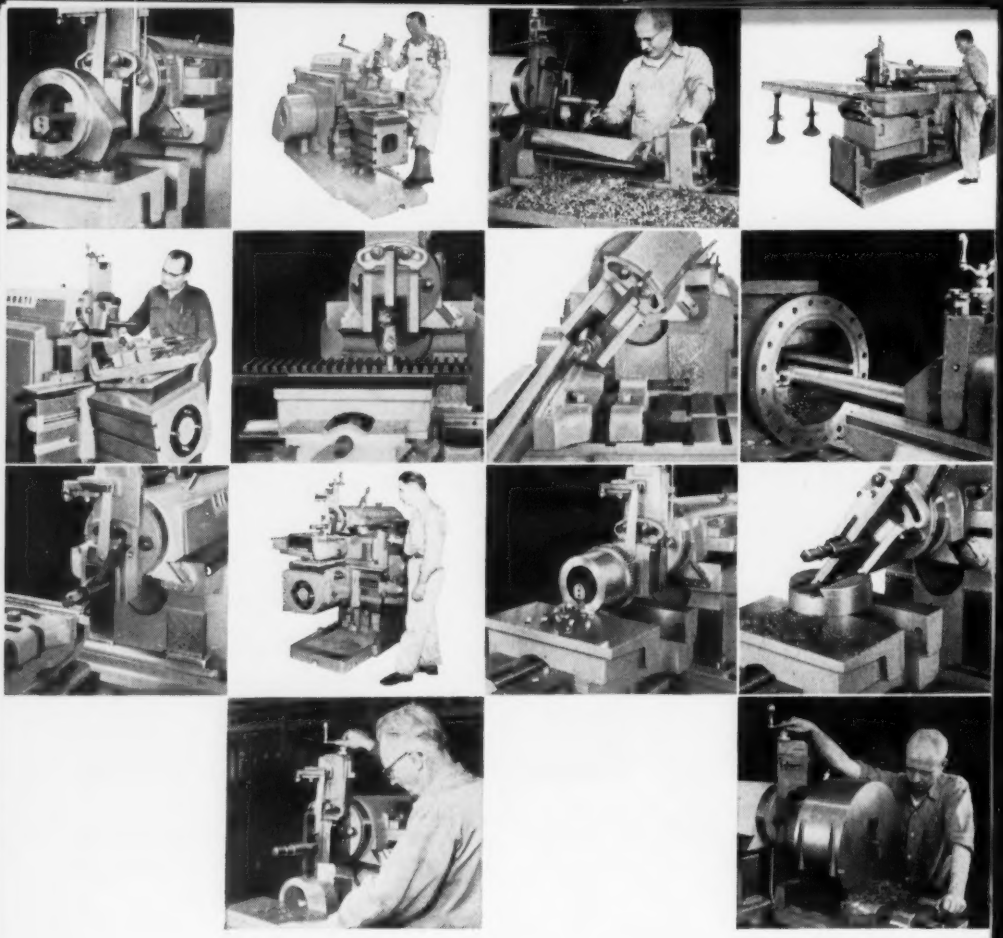
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SUNDSTRAND-*American* BROACH

DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN

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PAYOFF: VERSATILITY

In the tool shop or in your high production bay, the wide-ranging versatility of a Cincinnati Rigid Shaper gives you maximum productivity for your invested dollar. And for each of the many jobs you can do on it, a Cincinnati Rigid Shaper produces something extra—in metal cut per hour, in accuracy, in ease of operation. See for yourself why a new Cincinnati® Shaper would pay off for you: write Dept. G, for Catalog N-7.

Shapers / Shears / Press Brakes

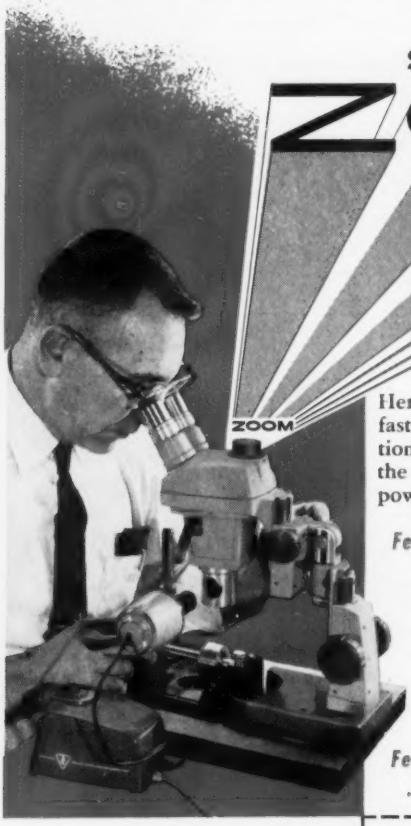
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STEREO ZOOM



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WHY BUY METAL YOU DON'T USE?

Switch to Allegheny Ludlum Cast-to-Shape Tool Steel



FORGING

Stepped-out forging for fabricating spinning cone: 2300 lbs.—$2691 material cost plus cost of machining.



CAST-TO-SHAPE

Cast-to-shape spinning cone 1059 lbs. $860.97 Includes cost of the pattern.

$1,831 Saved by changing to Cast-to-Shape

Why pay for metal that ends up as chips on your floor? Here are two fine reasons for switching to Allegheny Ludlum cast-to-shape tool steels.

CAST-TO-SHAPE MEANS YOU BUY FEWER POUNDS OF METAL.
Because the tool you buy is closer to its finished shape, you obviously spend less money on original metal. In the above example, the savings in metal cost alone amount to $1,894.

CAST-TO-SHAPE MEANS LESS FINISH MACHINING.
A casting like that above has only ¼ to ⅜ inches of machine stock on all surfaces, requiring very little machining compared to solid chunks. Cast-to-shape tooling is especially economical when working with intricate shapes.

Allegheny Ludlum, a tool steel producer who makes cast-to-shape materials, casts them with the same precise quality control for which their tool steels is known. A full line of cast-to-shape tool steel grades is available. You'll find ones with high resistance to abrasion, compressive strengths of approximately 400,000 psi, easy machinability, hardening with almost no distortion, toughness, high red hardness, and the capacity to take a high polish.

Find out now how you can cut costs on your complex tools. Write for FC-4, a 28-page technical discussion of A-L's Forging and Casting Division with applications, pattern information, design tips, analyses, and heat treating instructions. Or call your nearest A-L tool steel warehouse or distributor.
ALLEGHENY LUDLUM STEEL CORPORATION, OLIVER BUILDING, PITTSBURGH 22, PENNA. Write to Dept. MS-17

WSW 7270

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Tool Steel warehouse stocks throughout the country . . . Check the yellow pages

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EDITORIAL ITEMS

1	26	51	76	101	126	151	176
2	27	52	77	102	127	152	177
3	28	53	78	103	128	153	178
4	29	54	79	104	129	154	179
5	30	55	80	105	130	155	180
6	31	56	81	106	131	156	181
7	32	57	82	107	132	157	182
8	33	58	83	108	133	158	183
9	34	59	84	109	134	159	184
10	35	60	85	110	135	160	185
11	36	61	86	111	136	161	186
12	37	62	87	112	137	162	187
13	38	63	88	113	138	163	188
14	39	64	89	114	139	164	189
15	40	65	90	115	140	165	190
16	41	66	91	116	141	166	191
17	42	67	92	117	142	167	192
18	43	68	93	118	143	168	193
19	44	69	94	119	144	169	194
20	45	70	95	120	145	170	195
21	46	71	96	121	146	171	196
22	47	72	97	122	147	172	197
23	48	73	98	123	148	173	198
24	49	74	99	124	149	174	199
25	50	75	100	125	150	175	200

For your hand written comments:

ADVERTISEMENTS

301—Front Cover					410	435	460	485	510	535	560	585	610
302—Inside Front Cover					411	436	461	486	511	536	561	586	611
303—Inside Back Cover					412	437	462	487	512	537	562	587	612
304—Back Cover					413	438	463	488	513	538	563	588	613
305	326	347	368	389	414	439	464	489	514	539	564	589	614
306	327	348	369	390	415	440	465	490	515	540	565	590	615
307	328	349	370	391	416	441	466	491	516	541	566	591	616
308	329	350	371	392	417	442	467	492	517	542	567	592	617
309	330	351	372	393	418	443	468	493	518	543	568	593	618
310	331	352	373	394	419	444	469	494	519	544	569	594	619
311	332	353	374	395	420	445	470	495	520	545	570	595	620
312	333	354	375	396	421	446	471	496	521	546	571	596	621
313	334	355	376	397	422	447	472	497	522	547	572	597	622
314	335	356	377	398	423	448	473	498	523	548	573	598	623
315	336	357	378	399	424	449	474	499	524	549	574	599	624
316	337	358	379	400	425	450	475	500	525	550	575	600	625
317	338	359	380	401	426	451	476	501	526	551	576	601	626
318	339	360	381	402	427	452	477	502	527	552	577	602	627
319	340	361	382	403	428	453	478	503	528	553	578	603	628
320	341	362	383	404	429	454	479	504	529	554	579	604	629
321	342	363	384	405	430	455	480	505	530	555	580	605	630
322	343	364	385	406	431	456	481	506	531	556	581	606	631
323	344	365	386	407	432	457	482	507	532	557	582	607	632
324	345	366	387	408	433	458	483	508	533	558	583	608	633
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Milling machine ARBORS, ADAPTERS and

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Full-time tooth engagement, plus all these features:

Interchangeable to 40 or 50 taper machines • quick change • lower cost • more production • longer cutter life • correct arbor length • tool adapters • high speed rugged live bearing support.

Write for free literature and price list.

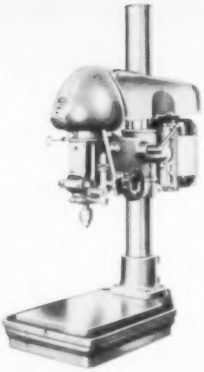
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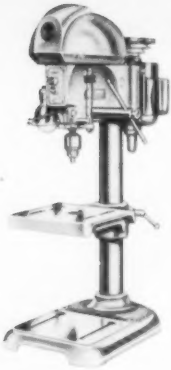
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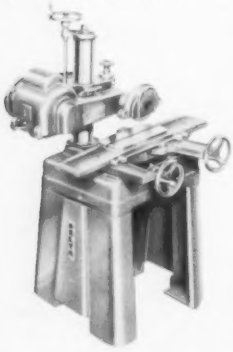
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14" SUPER-HI SENSITIVE



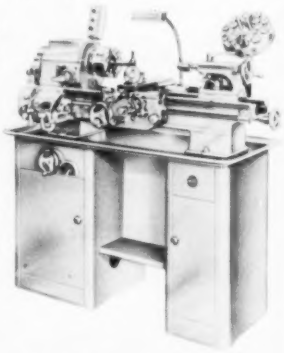
14" DRILL PRESS



TOOLMAKER® GRINDER
Surface, Chipbreaker, Tool & Cutter



7" GRINDER
Also 6" Tool Grinder, 6" Bench



11" METAL LATHE—4' and 5' Bed; Also Hand Screw Machine

DELTA INDUSTRIAL

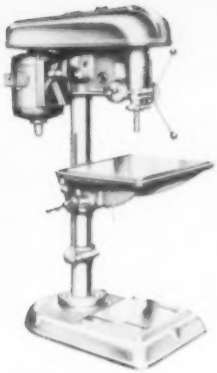
a proved way to cut

You can match the tool to your job for bigger savings—supplement or replace expensive, special-purpose machines—when you choose from the world's most *complete* line—53 Delta machines, 246 models, over 1300 accessories. Delta tools cost less to buy, operate, and maintain. They offer precision performance to meet exacting requirements even under rugged, production-line use.

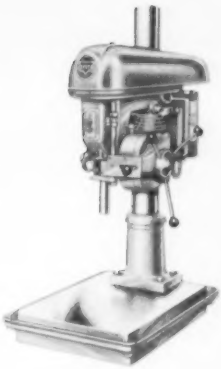
And because you can combine standard Delta components with automatic control devices, you can have the money-saving advantages of automation at a fraction of the usual cost. Ask your Delta Dealer about Delta "lo-cost automation"—he's listed under "TOOLS" in the Yellow Pages.



MULTIPLE SPINDLES



17" DRILL PRESS



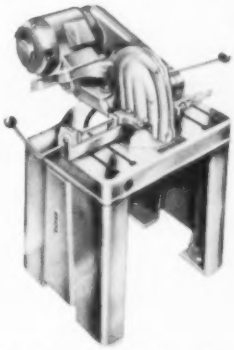
20" DRILL PRESS



14" METAL-WOOD BAND SAW
Also 14" and 20" Wood



6" ABRASIVE BELT FINISHER
Also 12" Disc, 2½" Belt Grinder



CUT-OFF MACHINE Wet & Dry
Abrasive, Non-Ferrous & Wood

PRODUCTION TOOLS

metalworking costs

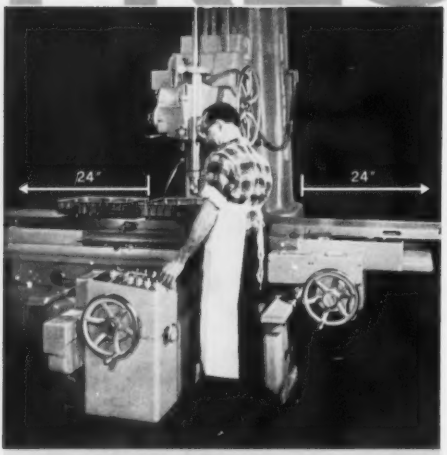
FREE—Delta Industrial Catalog ... Get all the facts on the complete line of Delta metalworking and woodworking tools and accessories. Write: Rockwell Manufacturing Company, Delta Power Tool Division, 606B N. Lexington Avenue, Pittsburgh 8, Pennsylvania.



DELTA INDUSTRIAL TOOLS
another fine product by
ROCKWELL

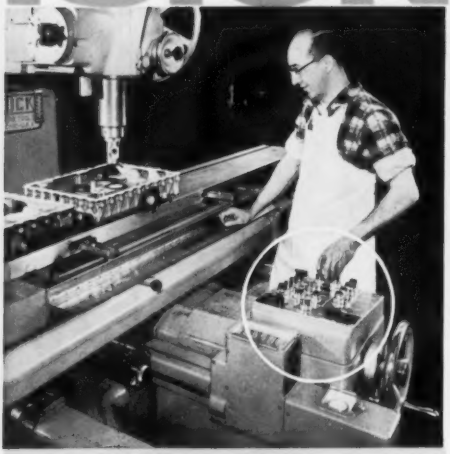
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PRECISION



LONG TABLE TRAVEL

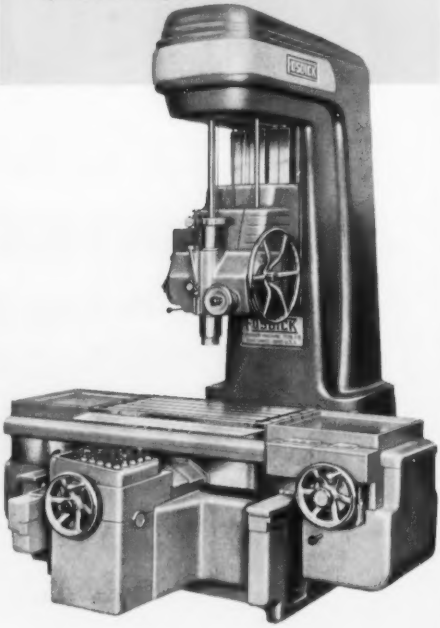
Longitudinal travel — 48" Cross travel — 22"



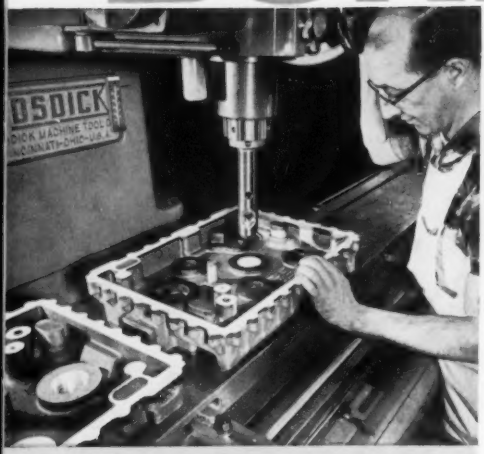
AUTOMATIC POSITIONING

with Direct Dimension Measuring and fast B-F Spindle tool changing

FOSMATIC JIG BORER



BORING



WITH NO REJECTS

hole location accurate to ±.0001"

hole sizes repeated to ±.0001"

SAVE 300 HOURS PER UNIT

on precision boring of gear boxes. Each unit (2 halves) calls for over 200 holes from ¼" to 4½" dia. Boring, spot facing, recessing, milling, tapping and counter boring. Material is aluminum alloy.

Boring time reduced from 800 hours to 500 hours per unit—with no rejects in all 50 parts—and every one accurate to ±.0001" on hole size and location! Over 200 holes per unit are machined.

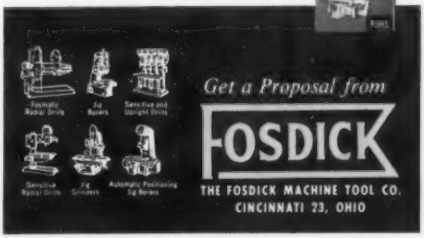
Mr. R. Schmidt of Triangle Tool Co., Union, N. J., owner of this Fosmatic Jig Borer, reports, "Two Fosmatic features were largely responsible for this important time saving. First, the Fosmatic's long table travel permitted machining two parts at once. Second, the automatic positioning and Direct Dimension Measuring System work simply and fast. They eliminate confusion and help the operator work accurately and efficiently. Incidentally, that long table travel helped get us several new jobs we could never have handled on our other jig borer."

With Direct Dimension Measuring the operator sets dimensions direct from blueprint onto two direct reading drum dials. At the press of a button, the table automatically positions work to ±.0001". On the Fosmatic, this operation and all other machine functions can be numerically controlled by punched tapes or cards.

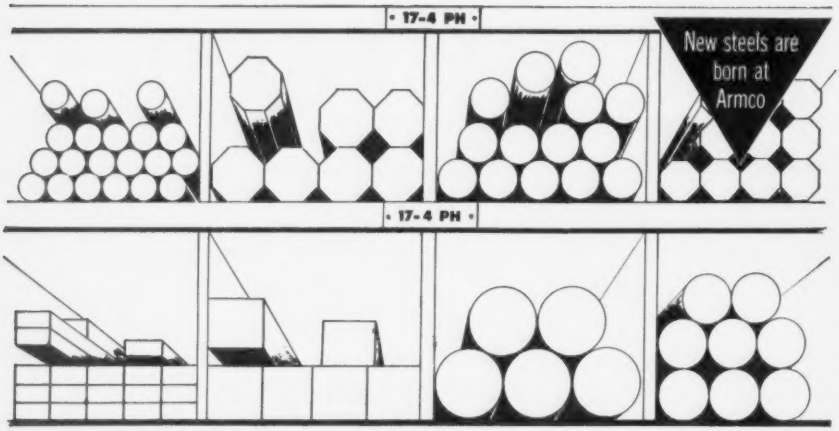
Fosmatic Jig Borers bring you many important advances in boring technology. Where progress has been so great, the obsolescence of your old machine may be more costly than you suspect. *Why not run a check?* Call your Fosdick Distributor or write us today.

Ask for Fosmatic Jig Borer Bulletin JB-S





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Many Distributors Now Stock Armco 17-4 PH Stainless Steel

New applications for Armco 17-4 PH Stainless Steel have developed so fast that many Armco Distributors around the country are stocking this special precipitation hardening grade in a variety of sizes for immediate delivery.

There are two reasons for the popularity of Armco 17-4 PH. It has unique fabricating characteristics and exceptional mechanical properties when fully hardened. This special steel can be finish-machined in a soft condition, then brought to full hardness (Rockwell C 44) with a single low-temperature (900 F) heat treatment.

For complete information on Armco 17-4 PH Stainless Steel, just call your nearby Armco Distributor. Write us for his name if you aren't already acquainted with him. Armco Steel Corporation, 1729 Curtis Street, Middletown, Ohio.

ARMCO STEEL

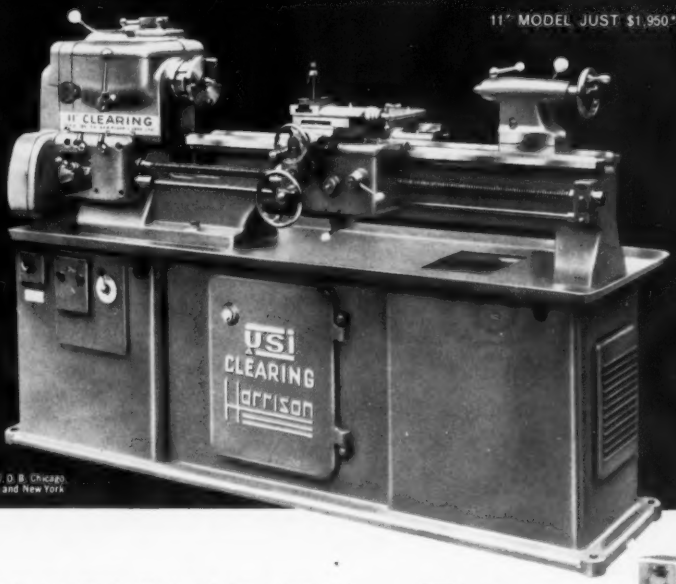
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HERE IS *QUALITY* AT A SENSIBLE PRICE

the *NEW* CLEARING-HARRISON

11″ MODEL JUST $1,950*



*Base Price F. O. B. Chicago, Los Angeles and New York

Not only does the Clearing-Harrison look like a lathe that should cost 50% more than its list price, it performs that way. And it will continue to perform year after year as only a fine machine tool built to uncompromisingly high standards of precision can.

It has taper roller bearings in the spindle, hardened and ground ways, precision hobbed, heat treated nickel chrome gears. A removable section in the bed provides a gap giving a maximum swing of 18¾″ on this 11″ lathe. These and other fine features are found only in the Clearing-Harrison—sold and backed by Clearing division of U.S. Industries, Inc.

Delivery is immediate on this and on 13″ and 16″ lathes, too. Find out more about these and the many other benefits you get on the Clearing-Harrison. Write Clearing for details.

Clearing, division of U. S. Industries, Inc., also manufactures the Clearing-Axelson line of engine lathes, power presses of all types, dies and special tooling, and special equipment for the aircraft and missiles industry.



● 13″ Swing $2,950 ● 16″ Swing $4,450

Also available with factory-built copying attachments.

Coast to Coast Service Facilities

Clearing's nationwide facilities assure you of prompt service always. Replacement parts and accessories are stocked at Clearing and are available through all three plants, at all service centers and through all Clearing dealers.



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MATTISON
HIGH-POWERED PRECISION
GRINDING METHODS

New Grinding Method Speeds Production, Increases Accuracy

Mattison's new Quick-Tilt spindle changes the entire economics of surface grinding—increases production 50%, or more.

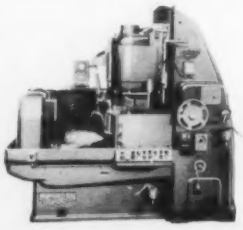
Now—replace your obsolete vertical-spindle surface grinders with a machine that increases production *without* compromising flatness.

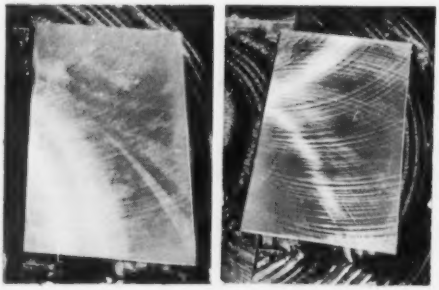
If you are a grinding man, you know it takes pressure, backed by rigid machine construction, to hog off metal with a grinding wheel. Our Nos. 24's and 36's offer higher horsepower and more beef in the right places than any similar grinders on the market.

New Quick-Tilt spindle

To increase utilization of power and rigidity, Mattison has added the Quick-Tilt spindle. Now, with the flick of a switch, you can tilt the spindle .008 to .010 in. reducing wheel contact area and increasing grain penetration. This lets you start your job with a hard cut. Dull grits are torn away automatically, reducing downtime for wheel dressings.

As parts approach size, the operator stops the machine momentarily and moves the selector switch to "flat," tilting the spindle to true vertical position for grinding out all concavity.





Left, surface pattern after roughing at high downfeed rate. Right, perfect cross-hatch finish of dead flat piecepart after second grind.

You get dead flat pieceparts in less time than it takes for roughing on conventional grinders. (Note: Since tilted wheel is more versatile, fewer grits and grades will be required to handle your grinding requirements.)

The Mattison "No. 24" has an 18 in. capacity under the wheel (24 in. optional). It is available with a 42 in. table, plus these important features: continuous downfeed; automatic cycling; air-gage measuring; separate coolant tank; fully protected ways.

Here's a machine that reduces nonproductive time for wheel changing and dressing . . . virtually eliminates downtime for cleaning . . . cuts your grinding wheel bill . . . increases both productivity and accuracy.

Phone the factory—WO 2-5521, or your Mattison dealer.

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MATTISON MACHINE WORKS

HIGH-POWERED PRECISION SURFACE GRINDERS



POSITIVE DUPLICATION – EVERY TIME!



(PD) ° Distinctive bullet markings occur every time a bullet leaves the same gun barrel. The barrel rifling grooves the slug, making possible *positive identification*—an important contribution to the science of ballistics.

WHEELS MATCHED TO MACHINE

Just as a bullet is matched to a gun barrel, so CINCINNATI (PD) CENTERLESS WHEELS (like those shown above) are matched to your centerless grinding jobs. Thirty-five years of centerless grinding experience back up each application of CINCINNATI (PD) WHEELS to your operation.



PRECISION PERFORMANCE

And every time—time after time—when you reorder a CINCINNATI (PD) WHEEL, it will act and grind exactly like the original. The Positive Duplication of wheel grades by the remarkable (PD) manufacturing process *will help maintain your production*—and save you both time and money.

Whatever CINCINNATI (PD) WHEEL you specify . . . centertype, centerless, internal, surface, toolroom, or snagging wheel . . . you get Positive Duplication—every time!

APPLICATION BY SPECIALISTS

Here's another advantage for you. Each one of our factory representatives is a highly trained and experienced specialist in grinding machine set-ups and operations. For his help on those extra-tough grinding problems, call your CINCINNATI (PD) GRINDING WHEEL distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI GRINDING WHEELS

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

° Trade Mark Reg. U. S. Pat. Off.

For more data circle 343 on Postpaid Card



YOU CAN CUT INVENTORY INVESTMENT OF MECHANICAL TUBING

If you depend on B&W and your local Steel Service Center . . . because:

- . . . your local Steel Service Center maintains large and diversified mechanical tubing stocks, available to you for immediate delivery
- . . . your local Steel Service Center can help you cut handling and storage costs and maintain production continuity

And when it comes to mechanical tubing, ask for B&W Job-Matched Tubing. For information on how this tubing can reduce your production costs call the local B&W District Sales Office or write for Bulletin TB-352. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

AMERICAN STEEL WAREHOUSE ASS'N

B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

TA-9000-SM1

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

For more data circle 344 on Postpaid Card

Another great
W-T "Light-Heavyweight"...

New

WT
ALKER-TURNER

17"

DRILL PRESS



Like the well-known 15" and 20" Walker-Turner drill presses, this new 17" unit is every inch a "Light-Heavyweight"—fast, accurate, dependable, and low in cost. It has the ruggedness and stamina to handle continuous heavy-duty production drilling—yet it's easy to move if you want to "take the tool to the work."

To suit a wide range of job requirements, this new big-capacity 17" drill press is available in 76 models—floor, bench or multiple spindle units with either hand or power feed. Also, it's a natural for building low-cost automated set-ups.

Your W-T distributor can show you the many outstanding features of this new "Light-Heavyweight." He's listed under "Tools" in the Yellow Pages.



FREE CATALOG

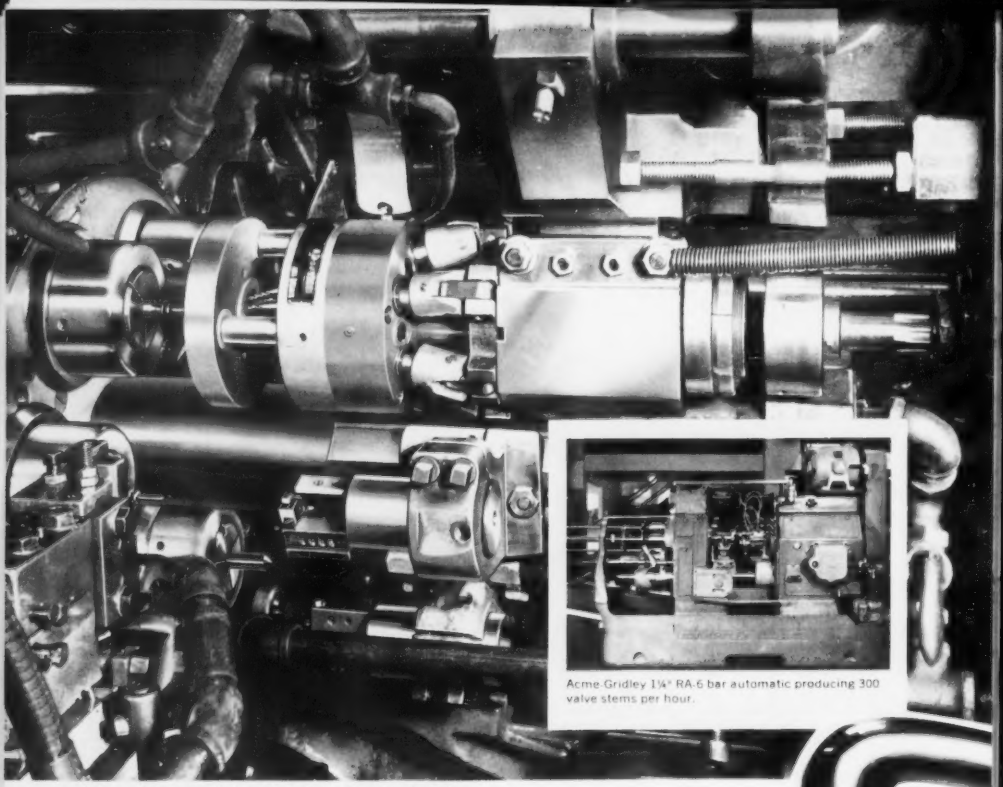
Write today for free catalog to Walker-Turner Division of Rockwell Manufacturing Co., Dept. **WE-22**, 400 N. Lexington Ave., Pittsburgh 8, Pa.

WALKER-TURNER
"LIGHT-HEAVYWEIGHT" MACHINE TOOLS

another fine product by

ROCKWELL

For more data circle 345 on Postpaid Card



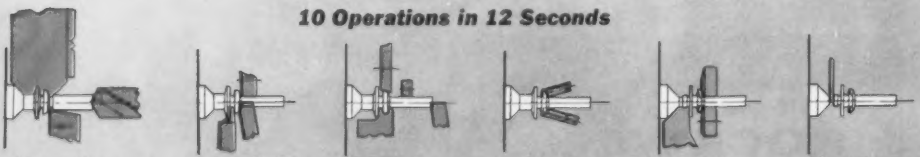
Acme-Gridley 1¼" RA-6 bar automatic producing 300 valve stems per hour.

Special Namco-designed multiple end milling attachment in the 3rd position.

When Tolerances and Finish Looked Economically Impossible

AMERICAN-STANDARD TURNS TO ACME-GRIDLEY...

10 Operations in 12 Seconds



6th position — Rough form rear — rough turn stem — spot drill

1st position — Finish turn stem face large diameter

2nd position — Shave — face and chamfer stem end

3rd position — Stop spindle — mill six slots

4th position — Start spindle — burnish stem — form back end

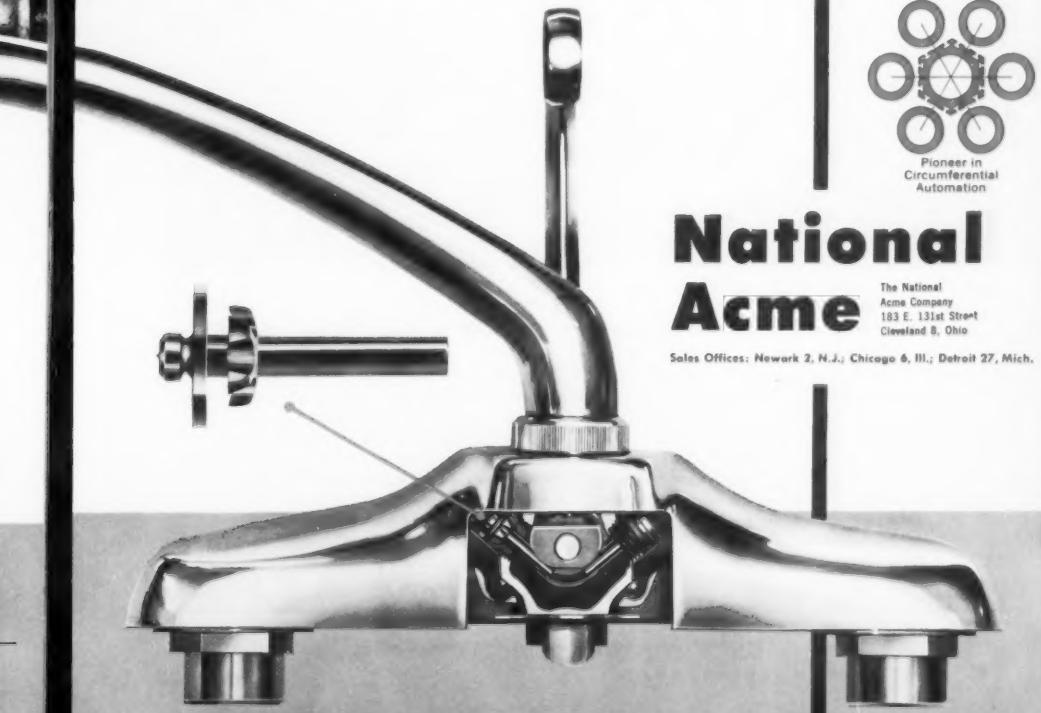
5th position — Cutoff



COMPLETED IN A SINGLE SETUP . . . this hyseal valve stem is a vital component in American-Standard's single-lever mixing faucet. Production by other processes would have meant a two-piece assembly. It would have been economically impossible to meet the high standard of quality and exacting tolerances maintained on this company's products.

Ten operations, including multiple end milling of six half-holes on a 15° angle, were performed on this 303 stainless steel piece in 12 seconds. Rigid specifications required a 20 microinch finish and limits of .002 t.i.r. between seating surface and end of valve stem.

Advanced spindle stopping design and the inherently accurate indexing of Acme-Gridleys, assure proper alignment of the work with the standard and special tool attachments. This, together with wide open tooling zones and independently operated tool slides, helps assure the solution of "impossible" jobs at National Acme. Write or ask one of our representatives for the complete story on the industry's most modern approach to your cost reduction problems.



Pioneer in Circumferential Automation

National Acme

The National Acme Company
183 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

JONES & LAMSON
OPTICAL COMPARATORS

the man who needs
a new machine tool is
already paying for it



Tool inspection is easy — same with "hot" stuff

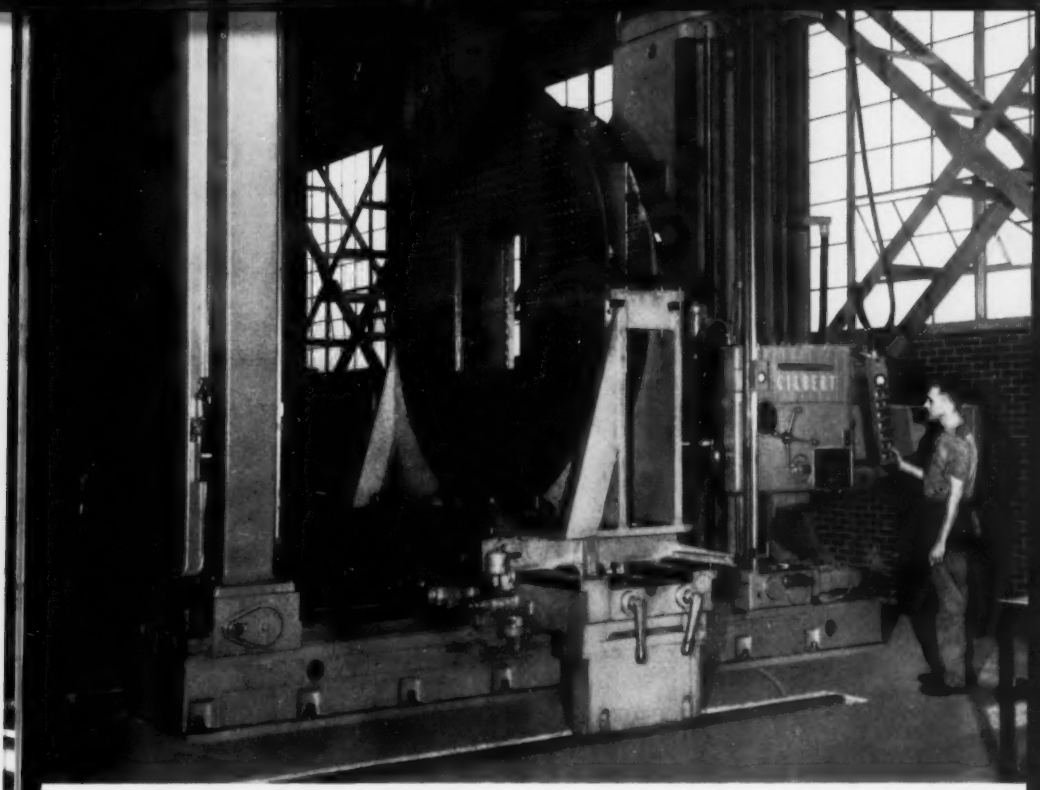
Controlling dimensional limits of new and resharpened cutting tools is mandatory for every manufacturing plant. And it's *so* easy to do with a J & L Optical Comparator. In fact, the photo above tells the whole story. Just set up the tools and look at the precisely magnified image. Extreme accuracy, ease of operation and low maintenance are the keys to this operation. And they inevitably result in improved quality and lower costs.

In the atomic energy field, too, the same features make the unusual job simple. A customer says: "It is highly advantageous to have J & L comparators in a 'hot' lab — they can be moved from station to station without impairing accuracy, and are easily modified for remote operation."

Whatever your inspection problem, write Jones & Lamson Machine Company, 512 Clinton Street, Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Precision Boring Machines • Thread & Form Grinders • Optical Comparators • Thread Tools

For more data circle 347 on Postpaid Card



Courtesy Combustion Engineering, Inc.

Combustion Engineering uses Gilberts for precision boring on atomic reactors

It takes an unusual boring mill (specifically, a Cincinnati Gilbert) to meet the specifications on this job:

(a) diameters within .001",

(b) parallelism of center line of holes to center line of plate within .0001" per inch,

(c) parallelism of flat surfaces within .010",

(d) 32 R.M.S. surface finishes.

These are some of the machining requirements on this part for a fast breeder reactor built in the Chattanooga plant of Combustion Engineering, Inc., pioneer manufacturer in the nuclear field. They are typical of the quality of work assigned to this Cincinnati Gilbert table type horizontal boring mill. Automatic positioning makes work-handling fast and precise.

A number of other Gilbert boring mills are producing similar close-tolerance work for Combustion Engineering—proof that "those who buy Gilbert buy Gilbert again."

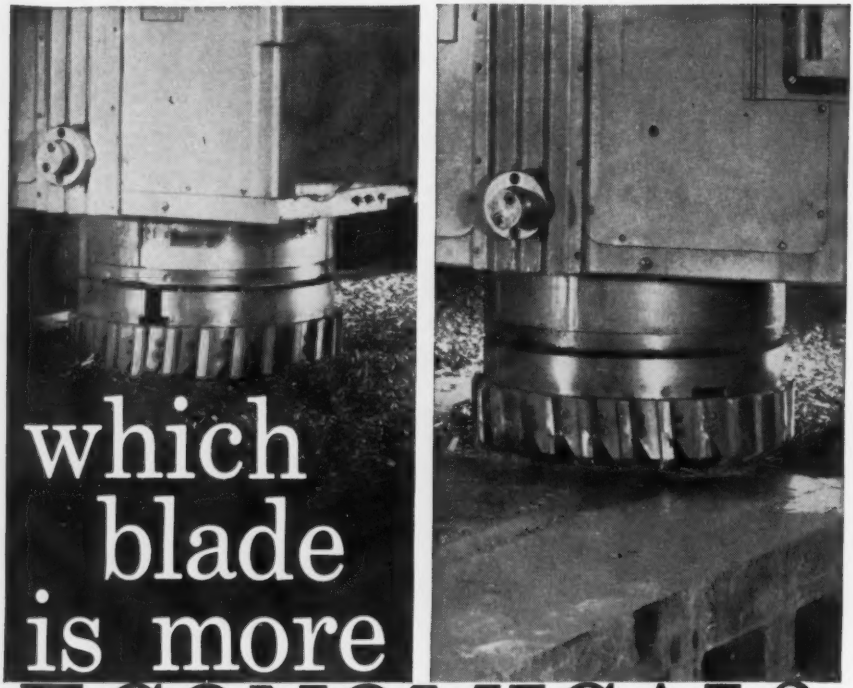
New Bulletin 1157 will show you why Gilbert boring mills do so many things so well.

The Cincinnati Gilbert Machine Tool Co., 3348 Beekman Street, Cincinnati 23, Ohio.

those who buy **GILBERT** *buy Gilbert again*

For more data circle 348 on Postpaid Card

high speed steel or carbide...



which blade is more ECONOMICAL?

Even in the most ordinary milling work, fields of application have a habit of overlapping. And, as a result, choice of the most economical and efficient blade material can often be a problem.

Solutions to machining problems like these are our primary product. You don't buy Ingersoll cutters, as such —or high speed steel or carbide blades. What you buy is lower operating costs and improved finish. You buy increased productivity!

Only after a thorough study of your machine, work piece, depth of cut, speed, feed rates and finish requirements do we recommend any cutter. And we assume full responsibility for every recommendation we make.

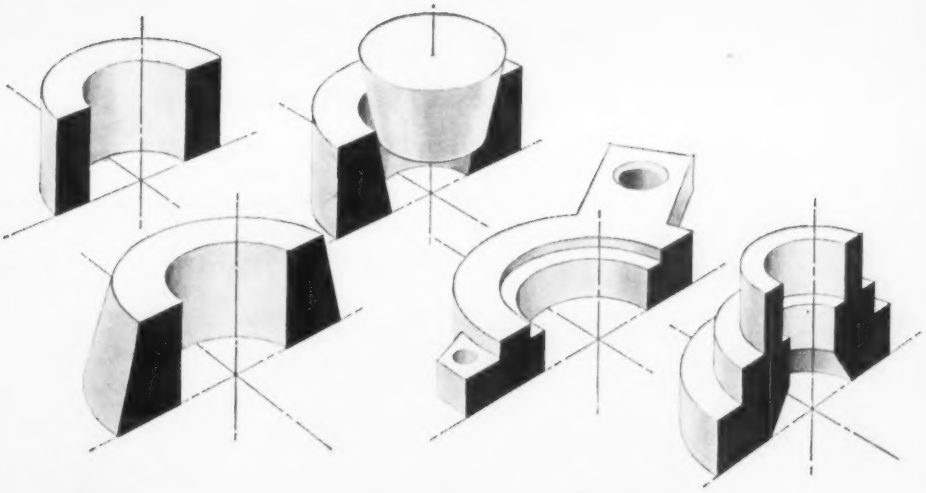
We would welcome the opportunity to tell you more about this unique cutter selection service. Write:



This helpful new booklet tells you how to reduce the cost of chips and improve your milling and boring performance. Ask for a free copy of booklet No. 68A.

THE
INGERSOLL
MILLING MACHINE COMPANY
CUTTER DIVISION
505 FULTON AVENUE • ROCKFORD, ILLINOIS

For more data circle 349 on Postpaid Card



when to consider Vertical Grinding

A simple test you can try for yourself quickly determines whether you should consider the Springfield principle of *vertical* grinding. Try it!

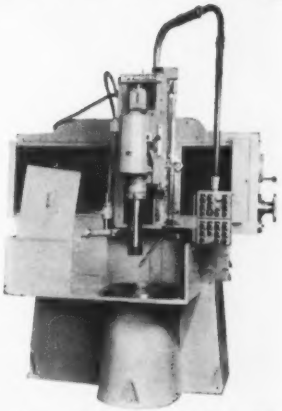
CHECK YOUR ANSWERS TO THIS QUIZ	YES	NO
1. Do you grind holes 4" in diameter and larger?	☐	☐
2. Do you grind taper holes or mating parts?	☐	☐
3. Do you grind on irregular shaped work?	☐	☐
4. Do you grind O.D. or I.D. shoulders, offsets, undercuts?	☐	☐
5. Do you grind pieces requiring extreme concentricity?	☐	☐
6. Do you require a 5 micro-inch or better finish?	☐	☐
7. Do some of your grinding jobs require many setups?	☐	☐

If you answer yes to three or more questions, a Springfield vertical universal grinder probably can save real time and money in your plant. Mail the coupon today for your free and informative copy of "Vertical Universal Grinders"; Bulletin 197-F.

THE SPRINGFIELD MACHINE TOOL CO., SPRINGFIELD, OHIO



SPRINGFIELD



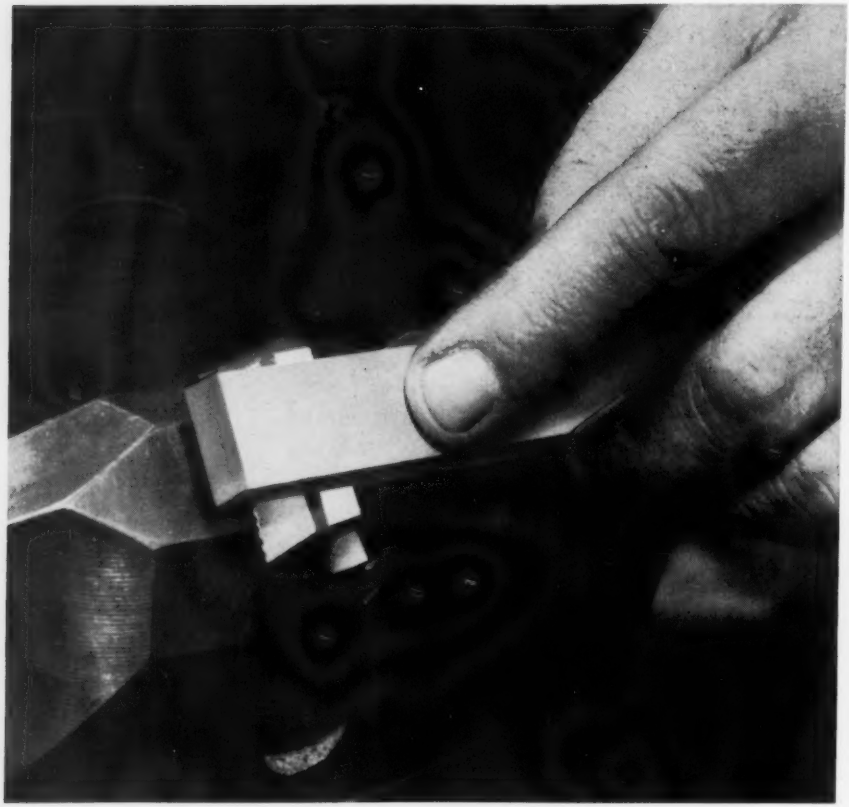
Above is a standard Springfield 2A-TR vertical universal grinder. It swings 25"; the grinding head has a 21" stroke and it grinds holes to a nominal depth of 18". The head can be tilted 45° in either direction. Electro-hydraulic control is standard with pendant pushbuttons. The Model 2A-TR costs less than most horizontal chucking grinders of comparable size; it can do the same work plus a wide variety of jobs that just can't be done on a horizontal. Gravity works for you in vertical grinding.

For more data circle 350 on Postpaid Card

for the toughest tool steel . . .



Hand stoning with INDIA® or ARKANSAS oilstone files is the choice of master mechanics for maintaining sharper cutting edges on lathe bits, millers, drills . . . and for deburring, chamfering, radiusing, and fitting of delicate parts.



BEHR-MANNING CO. TROY, NEW YORK

A DIVISION OF NORTON COMPANY NORTON ABRASIVES®

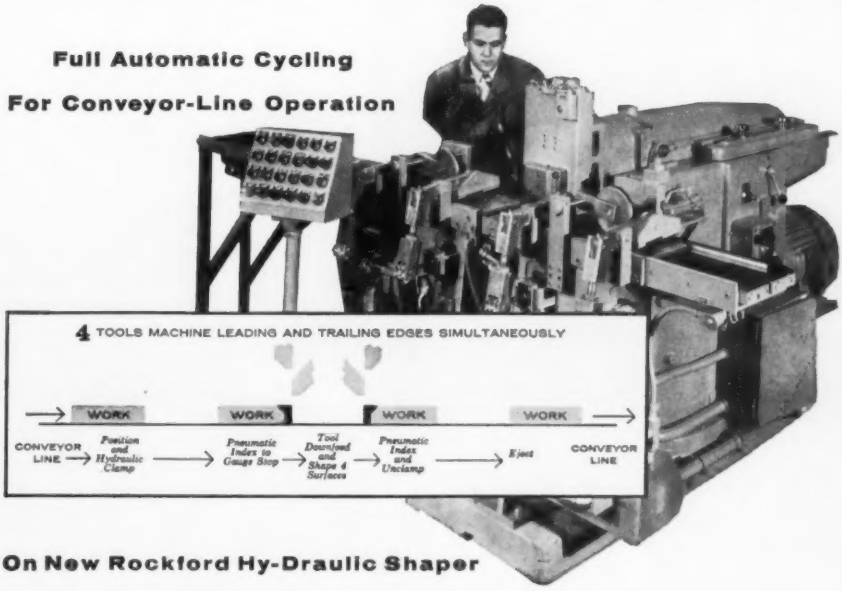
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals
In Canada: Behr-Manning (Canada) Ltd., Brantford. For Export: Norton Behr-Manning Overseas Inc., Troy, N. Y., U.S.A.

For more data circle 351 on Postpaid Card

Now... automation comes to shaping!

Full Automatic Cycling

For Conveyor-Line Operation



On New Rockford Hy-Draulic Shaper

Believed to be the first automatic shaper built, this standard 24" shaper with special tool head and cross-rail has been adapted to conveyor-line operation by arranging completely automatic cycling, including loading and unloading.

With this new method, many types of flat plates may be machined accurately and efficiently at high production rates, saving costly cutting tools and extra fixturing expense.

Four standard high speed steel tool bits with identical grinds are used to finish one vertical and one angular surface of each of 2 pieces simultaneously, as shown in diagramatic sketch of the automatic cycle. The machine features pneumatic index, hydraulic positioning and clamping, and positive mechanical feed. Operation is continuous until machine is stopped by operator, or automatic safety devices reject the cycle sequence.

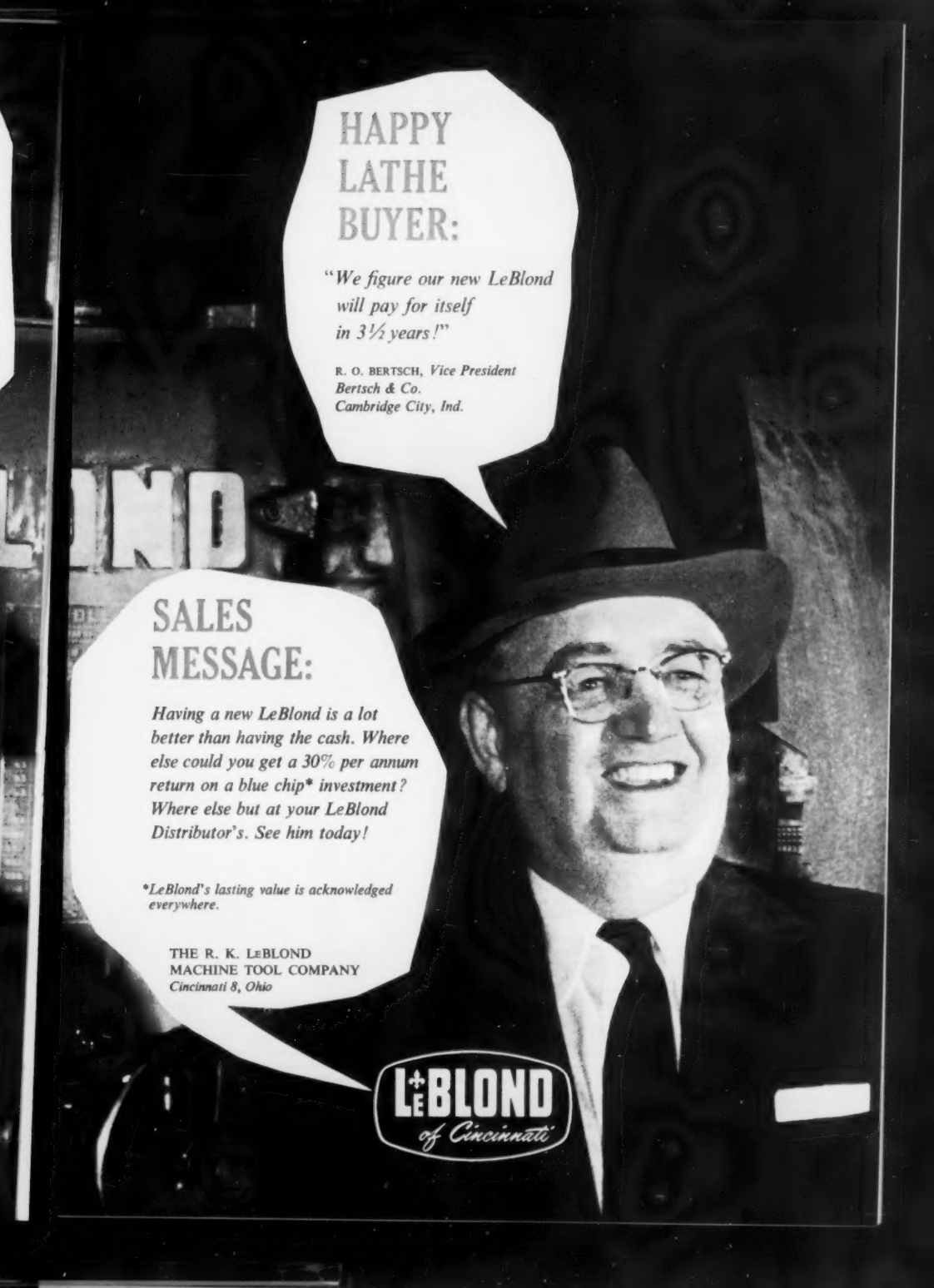
This type of automatic machining has many variations, using Rockford Hy-Draulic Shapers. If you have high output requirements for work which lends itself to this type of machining, send us blueprints for estimates and recommendations.

h HYDRAULIC

ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

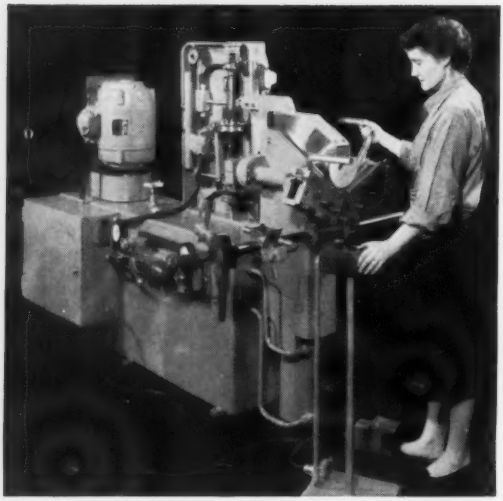
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HAPPY
LATHE
SALESMAN:
"This new 50" LeBlond
sold for more
than $100,000!"
O. W. "DOC" SHULL, Sales Engineer
Technical Equipment Sales Co.
LeBlond Indianapolis Distributors


HAPPY LATHE BUYER:
"We figure our new LeBlond will pay for itself in 3½ years!"
R. O. BERTSCH, Vice President
Bertsch & Co.
Cambridge City, Ind.
SALES MESSAGE:
Having a new LeBlond is a lot better than having the cash. Where else could you get a 30% per annum return on a blue chip* investment? Where else but at your LeBlond Distributor's. See him today!
*LeBlond's lasting value is acknowledged everywhere.
THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio
LeBLOND of Cincinnati

NEW PINES 3T PRESS

Cuts Bending Costs AS MUCH AS 50%



COMPLETE LINE OF BENDING PRESSES

In addition to the Model 3-T, Pines also builds the larger bending presses, illustrated below, which are also establishing outstanding performance records.

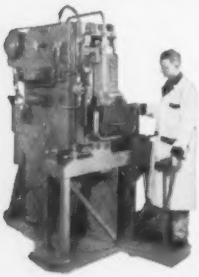
Makes Bends Progressively to Varied Angles In Multiple Planes 2 to 3 Times Faster

Quality bends at production speeds that are 2 to 3 times faster than conventional methods, are now possible with the new Pines 3-T Bending Press. Many tubular parts in sizes up to 1" O.D. are now formed at net speeds of over 1000 bends an hour. Up to 9 different bend angles can be produced in a single setup. Adjustable automatic indexing stops accurately control depth of ram stroke. Open tooling area permits rapid progressive bending in varied planes.

Wing Die Design Assures Quality Bends

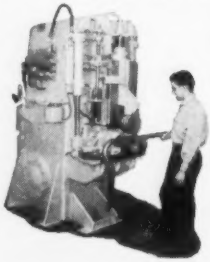
High production speed is just part of the story. Unusually smooth, good looking bends are produced to meet the quality demands of automotive, furniture, toy, office equipment, and appliance manufacturers. Wing dies of the press are designed to move in ways as a bend is made, and their pivoting action is hydraulically cushioned through bearing-mounted rocker arms. This principle eliminates scratches or draw marks and produces wrinkle-free bends with very little distortion. Get the complete story on cost cutting advantages of this new Bending Press today.

MODEL 6T FOR MULTIPLE U-FRAME BENDING



Makes two bends of the same or slightly different angles in each of two or more tubes simultaneously. Production of four or more bends with each stroke makes it possible to form 1700 to 3000 bends per hour in tube sizes ranging up to 1" O.D. x .065". When necessary, retractable ram dies are used to release pieces from die grooves. Like 3-T, wing dies move with work, eliminating draw marks, producing bends of superior quality.

MODEL 1900 FOR PROGRESSIVE BENDING OF TUBES UP TO 2" O.D.



Designed for high speed bending of parts requiring a variety of bends in different planes, such as automotive exhaust and tail-pipes, or similar work. Major features are automatic angle indexing and greater working clearance which permits completing, for example, 90% of all bends in a tail-pipe with a single tooling setup. Press handles stock sizes up to 2" O.D.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery

646 WALNUT • AURORA, ILLINOIS

WRITE FOR *FREE* DATA SHEETS

To keep abreast with bending, write for free copies of "Pines News"—get latest data on rotary and press-type machines, and up to date information on tooling.



PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

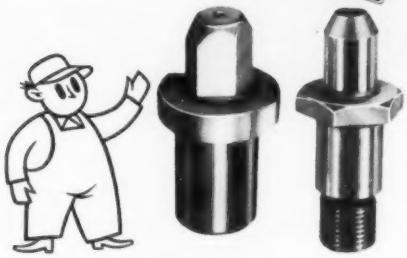
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FOR ACCURATE LOCATING USE UNIVERSAL LOCATING PINS

Universal Locating Pins assure quick, accurate locating throughout even the longest production runs. They're hardened and ground to extremely close tolerances . . . precision made to give long service life for much less than the cost of ordinary tool-room pins.

Press fit, threaded or lock-screw types, round or relieved, are stocked in all standard sizes for immediate delivery. Write for catalog detailing locating pins plus other Universal production tools.





Relieved Press-Fit Pin Threaded Pin



Lock Screw Pin

212

OTHER PRECISION-BUILT COST SAVING UNIVERSAL PRODUCTION TOOLS



Floating Chuck



Standard Collet Chuck



Mikro-Lok Boring Bar



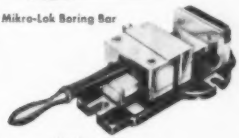
Boring Chuck



"Kwik-Switch" Tool Holder



Standard Drill Bushing



Wedge-Lock Production Vise

UNIVERSAL ENGINEERING COMPANY, FRANKENMUTH 9, MICHIGAN

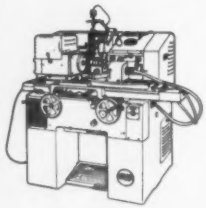
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MSO Since 1865

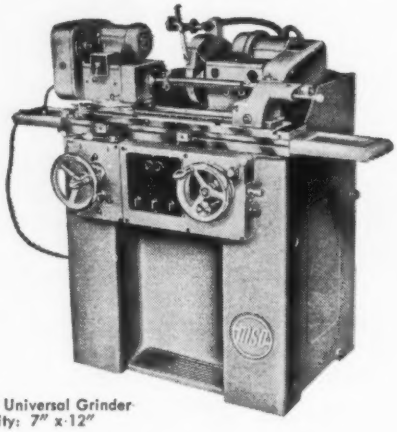
SOLVES Grinding Problems

This is the 94th consecutive year of MSO leadership in the development of improved grinding methods.
MSO offers unequalled precision in the most advanced grinding machines available anywhere.
Today, when your grinding problems are more complex than ever before, MSO, as always is one step ahead with the solution.

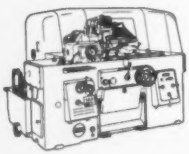
The MSO line comprises a full range of Plain and Universal Grinders, Cap. 7" x 12" to 22" x 138".



MODEL FH-200
HYDRAULIC PRODUCTION
GRINDER



Mod. FMES Universal Grinder
Capacity: 7" x 12"



MODEL GA-2
HYDRAULIC
THREAD GRINDER

FEATURES:

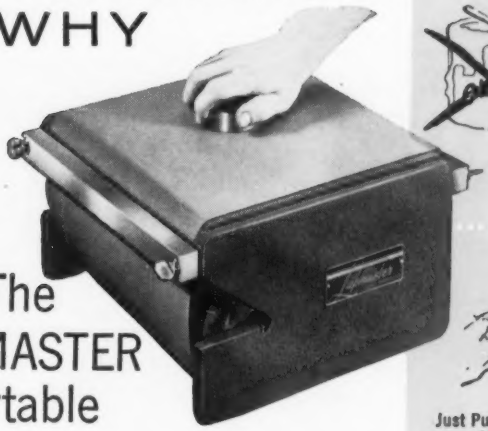
- Compound Swivelling Wheelhead
- Manual and automatic feed to wheelhead
- Fine feed to .00005"
- Manual and automatic table traverse
- Hinged Internal Grinding Attachment
- Patented adjustable MSO spindle bearings

austin industrial corporation

76-G Mamaroneck Avenue White Plains, New York

For more data circle 356 on Postpaid Card

4 REASONS WHY



The LAPMASTER Portable Polishing Stand

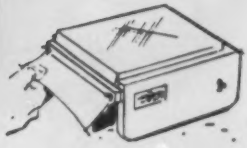
Simplifies Polishing

Makes polishing much easier because it holds polishing paper taut and wrinkle-free . . . *always*. Provides replacement of worn paper with new section . . . *immediately*. Steel stage has been lapped to precision flatness to assure a perfect polishing surface . . . *forever*.

The Lapmaster Polishing Stand is ideally suited for polishing work pieces prior to inspection . . . in the experimental mechanical laboratory...and for small run polishing jobs.

No Adhesives . . . No Special Cutting.

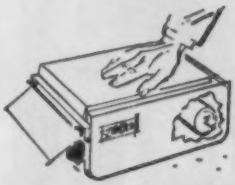




Just Pull Out . . . for Replacement of New Polishing Surface.



No Looseness . . . in Polishing Surface.



Always Taut . . . Eliminates Dubbing of Work Edges. Large Capacity Chamber. Holds 50 Yd. Roll of Paper.

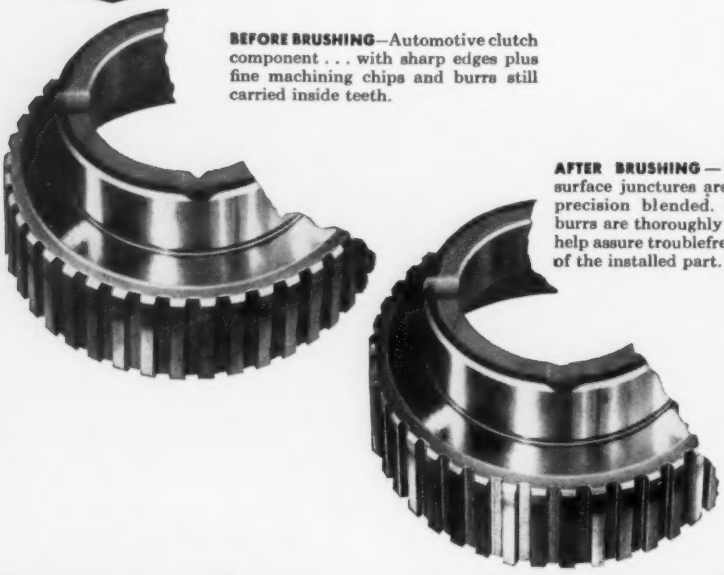
Lapmaster® DIVISION

Get further facts and details . . .
Write for copy of Bulletin L-410.

CRANE PACKING COMPANY
6418 OAKTON STREET
MORTON GROVE, ILLINOIS (*Chicago Suburb*)
In Canada:
Crane Packing Co., Ltd., Hamilton, Ont.

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OSBORN®

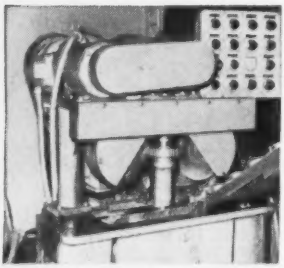


BEFORE BRUSHING—Automotive clutch component . . . with sharp edges plus fine machining chips and burrs still carried inside teeth.

AFTER BRUSHING—Edges and surface junctures are uniformly precision blended. Chips and burrs are thoroughly removed to help assure troublefree operation of the installed part.

Precision finish . . . in 7 seconds flat

...capacity 360 parts-per-hour with OSBORN Power Brushing



TWIN POWER BRUSHES deburr and edge-blend these parts on 7-second cycles. Osborn 6" Monitor® Brushes—operating at 1750 rpm—do the job at high production rates. Quality is excellent . . . cost is low.

IF you precision finish parts, and want to do the job faster . . . with improved quality . . . at less cost—today's Osborn Power Brushing methods can help you do it.

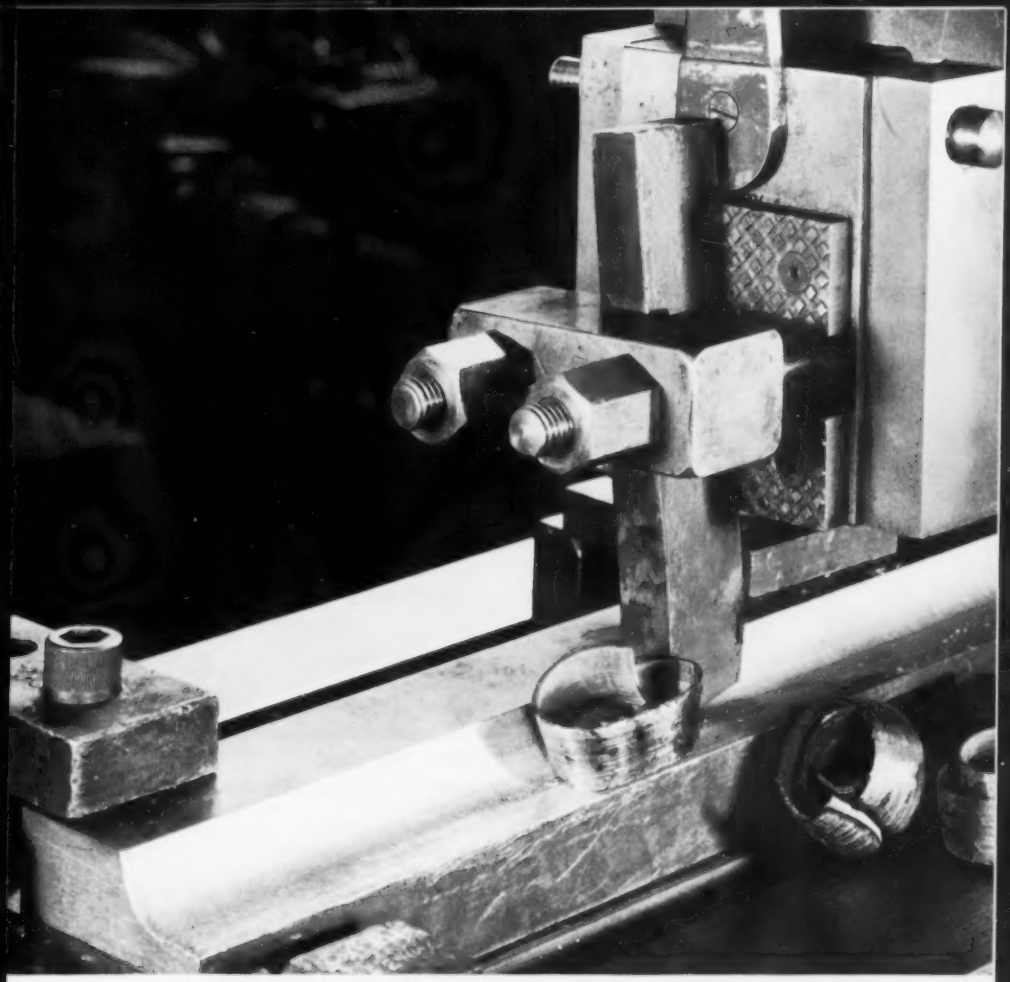
For example—this leading automotive parts manufacturer uses a dual-brush setup to automatically deburr and edge-blend precision clutch parts. In addition to the *versatility* and *precise quality control* he's afforded by Osborn Power Brushing—he finds finishing operations are done faster and at significantly lower cost.

It's typical of how *you* can pinpoint savings, too. An **O**sborn **B**rushing **A**nalysis—made in your plant at no cost or obligation—is the first step. Write us for full details. *The Osborn Manufacturing Company, Dept. B-22, Cleveland 14, Ohio.*

Osborn Brushes

BRUSHING MACHINES • BRUSHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

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Machining gib for heavy duty lathe from cold rolled steel. Depth of cut: 3/4"; feed: .060"

The Big Cut without the Big Cost

You can pay more, but you can't buy greater power and accuracy than a reliable Smith & Mills Shaper offers. Even if you spend thousands of dollars more, you will not obtain all the advantages of Smith & Mills.

In continuous high speed operation, using heavy feeds and maximum power, a Smith & Mills Shaper holds limits and resists deflection. Reasons are apparent . . . Solid Ram, unequalled for heavy duty, high production work . . . Patented Self-Locking Ram Adjustment for one-step positioning (even when reciprocating) and complete back-lash elimination . . . exclusive "Solid Unit" Bull Gear Assembly . . . ram, rocker arm, bull gear and other critical components of nodular iron.

Compare . . . feature for feature . . . cut for cut . . . cost for cost! Prove to yourself that a Smith & Mills Shaper offers all the power, accuracy and versatility of the expensive shapers, yet costs hundreds, even thousands of dollars less. Write today for details and specifications.

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SHAPERS

Division of NEBEL
Machine Tool Corporation
3409 Central Parkway, Cincinnati 25, Ohio

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PISTON-TYPE OIL RELIEF HYDRAULIC BY-PASS VALVES FOR **O. E. M.** OR **REPLACEMENT**

Best Buy because



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Fulflo stocking policy **and** practice permits quick shipment from stock of most standard types. Shipment is usually made within 24 hours.

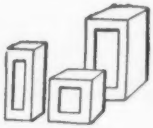




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Fulflo engineers are ready **and** able to help you with any valve problem. Modified standard or special valves can be provided for any need.

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- Standard and flanged models
- Just 6 springs for pressures to 500#
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- Pipe sizes to 3"
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Barrel-Finishing Machined Parts, one of a Norton series of reports, is based on the outstanding advantages of barrel-finishing over hand-finishing for many jobs.

Written by Norton Abrasive Engineers, who serve all industry, it tells you how barrel-tumbling improves surface finish and fatigue strength, removes burrs, forms uniform radii and reduces the production costs of all types of machined parts. And it describes how many users have found TUMBLEX* abrasives ideal for these applications. For example:

Manual finishing of large fabricated aircraft gears with a 4" wide tooth took eight hours each and left the tooth ends rough. With barrel-finishing, using random shaped ALUNDUM* TUMBLEX *"A" abrasive in combination with* TUMBLEX *"T" triangles, the gears could be tumbled in pairs producing uniform radii and a uniform, refined surface on the entire tooth.*

Get this report from your Norton Representative. It's as near as your phone. He'll also gladly supply facts and literature on all TUMBLEX Types: "A" (random shaped chips), "T" (bonded triangles), "S" (bonded spheres), and "N" (natural stones), covering all finishing requirements, on the widest range of materials. And for better, lower cost finishing of your work parts, send samples to our Sample Processing Department. They'll be finished and returned to you promptly, with complete facts as to abrasives, methods and equipment. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

NORTON
ABRASIVES

G-364

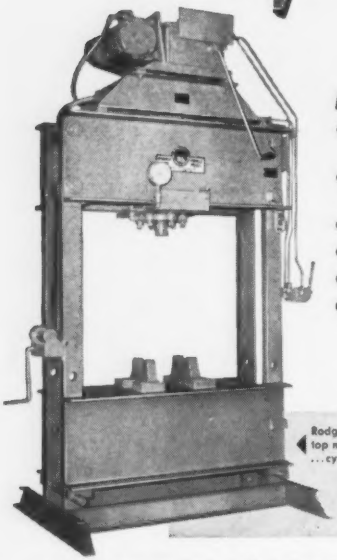
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BEHR-MANNING DIVISION Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

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A *Rodgers* Shop Press is *BEST for YOU!*

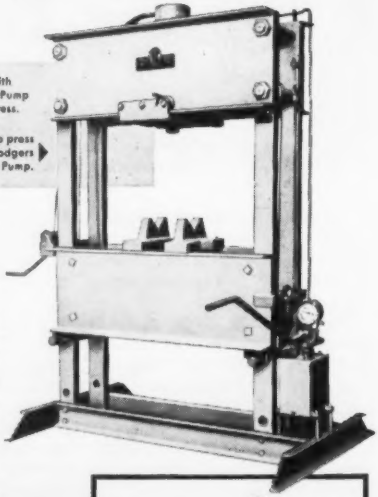


HERE'S WHY:

- **LONGEST RAM TRAVEL** with maximum hydraulic power throughout entire stroke.
- **REMOVABLE CYLINDER** for independent hydraulic power away from the press.
- **CYLINDER TRAVEL** full width of press, either way.
- **OPEN ENDS** allow long pieces to extend through sides of press.
- **EXTRA WIDE** inside work space to handle bigger jobs more easily.
- **GREATER STRENGTH** with heavy bar stock sides and pins—bearing blocks support bolster to give uniform distribution of pressure.

Rodgers 100 ton shop press with top mounted Greenlee Power Pump ...cylinder travels width of press.

Rodgers 100 ton shop press with Rodgers 2 speed Hand Pump.



WHEN YOU INVEST in a shop press it is more important to compare performance than initial cost!

Rodgers Shop Presses are designed and built for the most versatile service, and longest trouble-free life. In the shop they handle hundreds of diversified jobs... pressing, bending, straightening, assembling. For field work the Rodgers cylinder and pump are easily removed from the press, making an ideal portable power unit for jacking, lifting, heavy shaft removal and similar work.

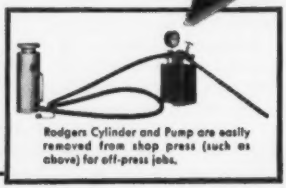
Rodgers produces the most complete line of shop presses available—capacities from 60 to 400 tons—in varied standard models with power pumps, top mounted or placed at the side—or hand pumps with 2 or 3 speeds.

When you compare shop press performance and cost you will find a Rodgers is best for you, too. Ask your Rodgers Representative for complete details—or write us.

SEND FOR NEW CATALOG...

It gives useful information and complete specifications.





Rodgers Cylinder and Pump are easily removed from shop press (such as above) for off-press jobs.

RODGERS HYDRAULIC, Inc.

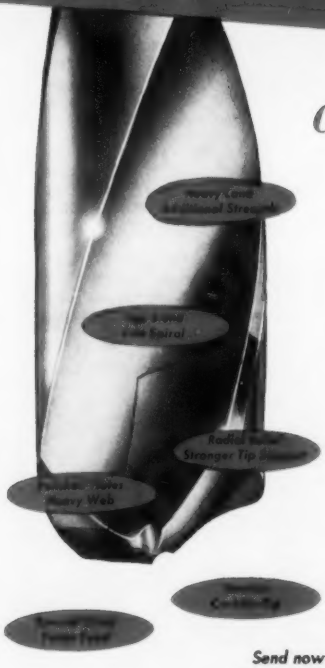
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As the biggest producer of carbide drills, we are able to offer a specific type for every carbide drilling application.

Exclusive features incorporated in these drills give greater tool life, faster cutting at lower cost.

High volume production facilities make tools available from stock.

Standards stocked in fractional, wire and letter sizes, in solid and tipped carbide; types for hardened steels, cast iron, aluminum, magnesium, plastics and abrasive substances. Solid carbide drills to .0135 diameter.

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STANDARD BROACHES from STOCK

Minute Man
KEYWAY
BROACH KIT

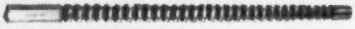


In one minute and for as little as one cent you can cut a keyway with the Minute Man Keyway Broach Kit. For keyways from 1/16" to 1" in any bore from 1/4" to 3".

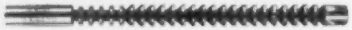
SAVE TIME AND MONEY
WITH THESE OTHER STANDARD
STOCK BROACHES



SQUARE BROACHES — 1/8" to 3/4" holes



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Meetings

Important Meeting Dates

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MAY 13-15 • American Supply and Machinery Manufacturers Association, Triple Industrial Supply Convention, Statler-Hilton Hotel, Dallas, Tex. Information: Thomas Associates, Keith Bldg., Cleveland 15, Ohio.

MAY 13-15 • Machinery Dealers National Association, Annual Meeting, Plaza Hotel, New York. Association headquarters: 1346 Connecticut Ave., N. W., Washington 6, D. C.

MAY 13-15 • Southern Industrial Distributors Association, Spring Meeting, Statler-Hilton Hotel, Dallas, Tex. Association headquarters: 1626 Fulton National Bank Bldg., Atlanta, Georgia.

MAY 14-17 • National Tool and Die Manufacturers Association, Spring Board Meeting, Marott Hotel, Indianapolis. Association headquarters: 907 Public Square Bldg., Cleveland 13, Ohio.

MAY 25-26 • Malleable Founders' Society, Annual Meeting, Homestead Hotel, Hot Springs, Va. Society headquarters: 1800 Union Commerce Bldg., Cleveland 14, Ohio.

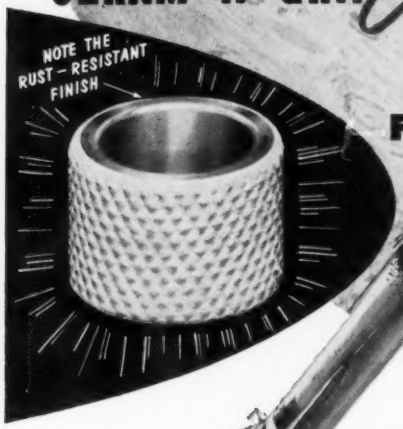
MAY 25-27 • American Society for Quality Control, Annual Meeting and Exhibit, Hotel Sheraton-Cleveland, Cleveland. Society headquarters: 161 W. Wisconsin Ave., Milwaukee 3, Wisconsin.

MAY 25-28 • Design Engineering Show and Conference, Convention Hall, Philadelphia. Information: Clapp and Poliak, 341 Madison Ave., New York 17, New York.

MAY 27-28 • American Iron and Steel Institute, Annual Meeting, Waldorf-Astoria Hotel, New York. Institute headquarters: 150 E. 42nd St., New York 17, New York.

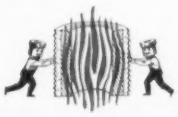
MAY 31-JUNE 3 • American Gear Manufacturers Association, Annual Meeting, Homestead Hotel, Hot Springs, Va. Association headquarters: 1 Thomas Circle, Washington 5, D. C.

CERAM-A-GRIP® American's New ceramic Precision Drill Bushing for PLASTIC TOOLING



CERAMICS — used as a barrier against the tremendously high temperatures encountered by the nose cones on ballistic rockets, has been adapted by the American Drill Bushing Co. to a line of precision drill bushings for use in plastic tooling. The Ceram-A-Grip bushing gives a maximum of protection against bushing misalignment and spin out, with a minimum sacrifice of close hole spacing.

EXCITING new development from the Space Age Laboratories

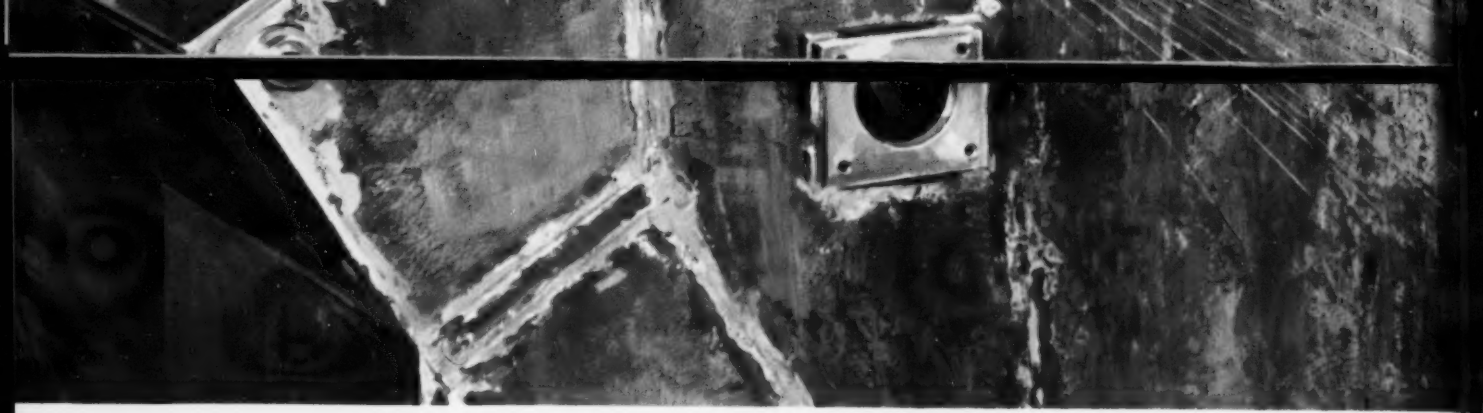


DO YOU HAVE A FRICTIONAL HEAT PROBLEM? THE THIN CERAMIC SHELL PROVIDES AN EFFECTIVE HEAT BARRIER! CERAMIC MATERIAL FUSED TO THE OUTER SURFACE OF THE PRECISION DRILL BUSHING EFFECTIVELY INSULATES THE PLASTIC POTTING MATERIAL FROM ANY EXCESS FRICTIONAL HEAT BUILD-UP IN THE BUSHING.



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This man knows how to use the "Touch of Gold"

He is bringing a product closer to its finished state, adding the "Touch of Gold" by using exactly the correct Norton reinforced wheel to do the best job. To help you bring this value-adding benefit to your product there are many types of Norton reinforced wheels, using different types of reinforcement . . . glass cloth, nylon, cotton and combinations of them. There are resinoid and rubber bonds . . . straight and depressed-center shapes for every grinding, cutting off or slotting job where you need reinforced wheels. And every wheel is a product of Norton research.

Your Norton Man can bring these "Touch of Gold" benefits to your production. He is a qualified abrasive engineer with broad, practical experience that is backed by Norton's complete line of abrasive products and world-wide resources and services. He can save you production time and money. Call your Norton Man. NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

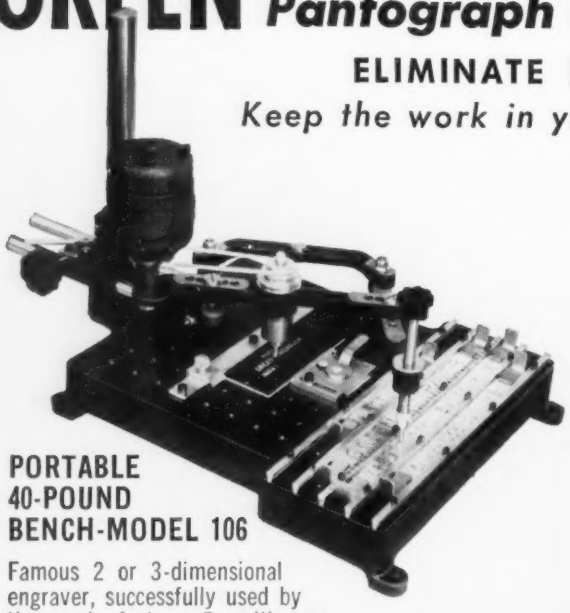
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GREEN *Pantograph Engravers*

ELIMINATE DELAYS!

Keep the work in your own plant.





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Famous 2 or 3-dimensional engraver, successfully used by thousands, features 5 positive, accurate pantograph ratios. Versatile ball bearing spindle has three speeds up to 14,000 rpm; height of pantograph and position of cutter are continuously adjustable; one copy carrier (supplied) accepts all standard master type sizes.

The Model 106 has proven incomparable for speed and accuracy . . . yet reasonably priced.

Cutter grinders, rotary tables, master letters, compound slides, name plates and all required accessories. For complete information, write to

MODEL D2 HEAVY-DUTY 2-DIMENSIONAL

- 575 pounds — rigid, sturdy, precise
- Vertical adjustment of copy table automatic with Pantograph
- Unobstructed on three sides to take large work
- Micrometer adjustment for depth of cut
- Ball-bearing construction throughout — super-precision ball bearing spindle
- Spindle speeds up to 26,000 rpm for engraving or machining modern materials
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- Vertical range over 10″

GREEN INSTRUMENT COMPANY, INC.

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interchangeable with all standard JIC cylinders

With the introduction of the ALL NEW T-J Squair Head, Tomkins-Johnson now offers industry the most complete design range of air and hydraulic cylinders. Presently available in bore diameters from 1½ to 8 inches, the T-J Squair Head is an interchangeable cylinder which produces maximum force and efficiency, with minimum pressures ... and is also adaptable to the use of low pressure oil as the working medium. Write today to Tomkins-Johnson, Jackson, Michigan, for Bulletin #SQ 10-58 and complete details.

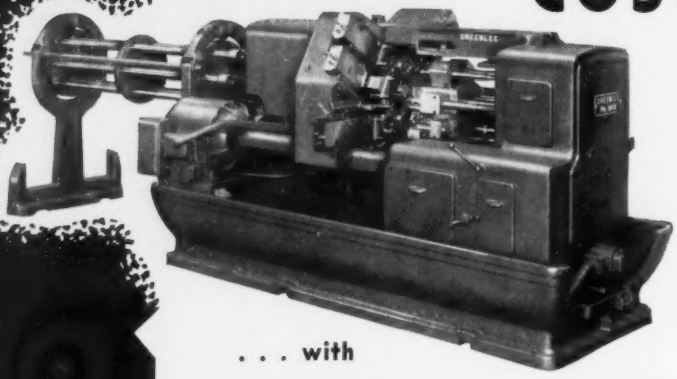
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1. One Piece Piston
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4. Cushion Adjusting Screw, Externally Adjustable
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8. Chevron Type, Self-Adjusting Rod Packing
9. Piloted Packing Gland—Absolute Alignment
10. Piston Rod, Extra Strong—Polished and Chrome Plated for Efficiency and Protection

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GREENLEE SIX-SPINDLE AUTOMATICS

1 CAMLESS MAIN TOOL SLIDE
2 QUICK SPEED AND FEED CHANGES
3 BUILT-IN THREADING AND FEED DRIVE
4 BALL-BEARING SPINDLE CONSTRUCTION
5 INDEPENDENT CROSS-SLIDES
6 WIDE OPEN TOOLING AREA



WRITE FOR CATALOG A-405

One way to boost production time is to reduce down time! Substantial savings in setup time and increased productive capacities are achieved with Greenlee Six-Spindle Automatics. Call in your Greenlee Representative. See how Greenlee Six-Spindle Automatics can help you beat rising production costs.

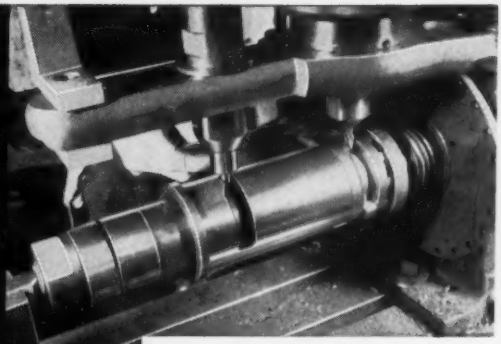
PRODUCTION MACHINERY
GREENLEE

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'Standard' off-the-shelf End Mill...

Speeds Production, Speeds Delivery of Machine Tool Clutch!



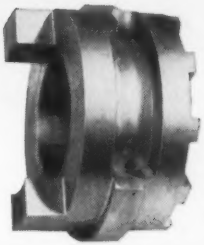
One of the 72, yes *seventy-two,* different Brown & Sharpe ½" End Mills that cut production days and add dollars of production profits to this job.

Operation: On tracer-controlled milling machine plunge cut and peripheral mill a cam track contour in special, extra tough alloy steel machine tool clutch.

Choose the correct Brown & Sharpe End Mill from the World's Largest Stock of "Standards" and start production.

Eliminate days of waiting for special tools—eliminate trial and error of unproved tools—with Brown & Sharpe PRODUCTIONEERED CUTTERS!

Send for Catalog showing more than *3400* "Standard" Brown & Sharpe Milling Cutters to: *Cutting Tool Division, Brown & Sharpe Manufacturing Company, Providence 1, Rhode Island.*



Machine tool clutch showing cam track milled with "Standard" Brown & Sharpe End Mill.



½" "Standard" Brown & Sharpe High Speed double-end End Mill.

FOR THAT EXTRA EDGE IN PRODUCTION

Brown & Sharpe

CUTTING TOOL DIVISION

HIGH SPEED STEEL CUTTERS
NELCO CARBIDE TOOLS
END MILLS



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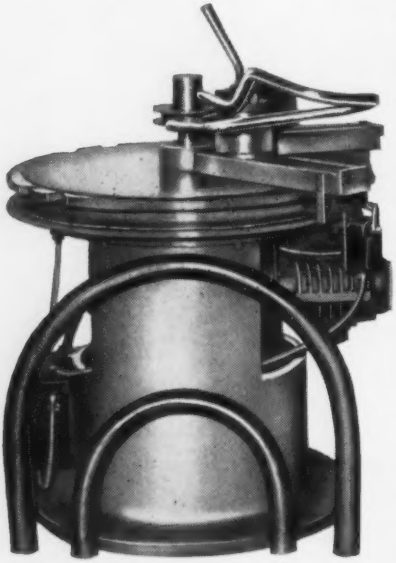
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Complicated pipe, tube or structural metal bends are a cinch with Pedrick Production Benders—on either a production or job basis.

Show us your problem—with drawings, if possible—and we'll show you the answer. Write PEDRICK TOOL AND MACHINE CO., 3640 N. Lawrence St., Phila. 40, Pa. Dept. 5.

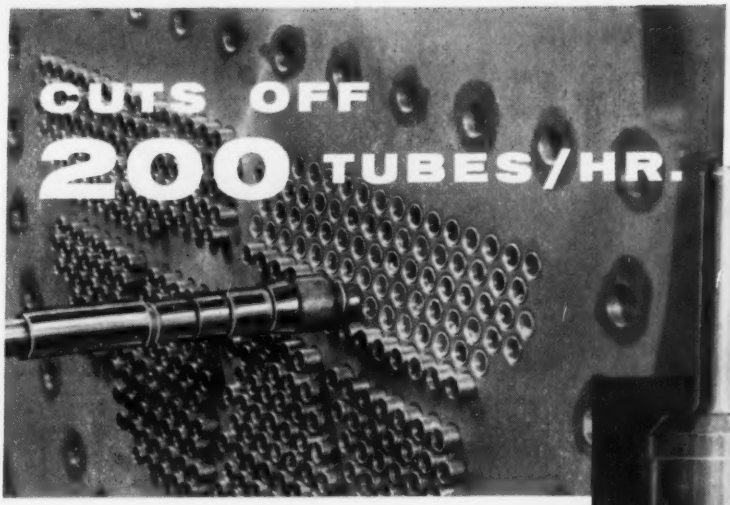


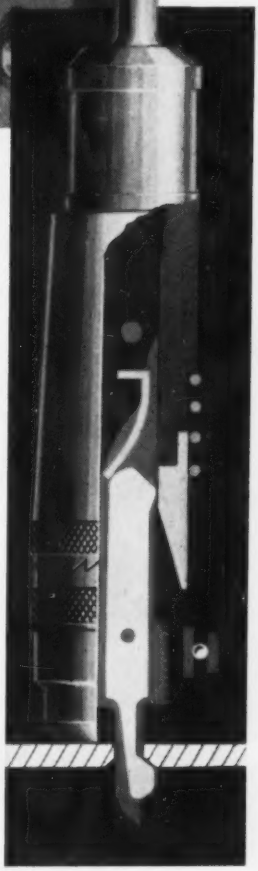


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PEDRICK production benders

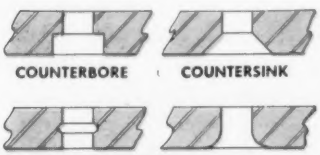
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This Cogsdill special cut-off tool, a variation of Cogsdill's famous Baksink, removes excess tubing from heat exchanger tube sheets at the rate of 200/hr. Time studies by one user showed time savings of 70% with this tool. A Baksink tool such as this makes quick work of cut-off: just one pass and the job's done. Key to this simplicity is Baksink's precisely cam-controlled cutter blade which can be adjusted to depth variations in .001" increments.

Baksink tools are versatile, fast too, for all sorts of back-surface chamfering, spotfacing, grooving, cut-off or radii machining. They eliminate costly special tools, fit any arbor. Send your prints and let Cogsdill engineers show the way to tube cut-off and back-surface savings—with Baksink.



FOR THE ASKING—Catalog on Baksink, Burraway Bearingizing, other Cogsdill time-saving tooling.



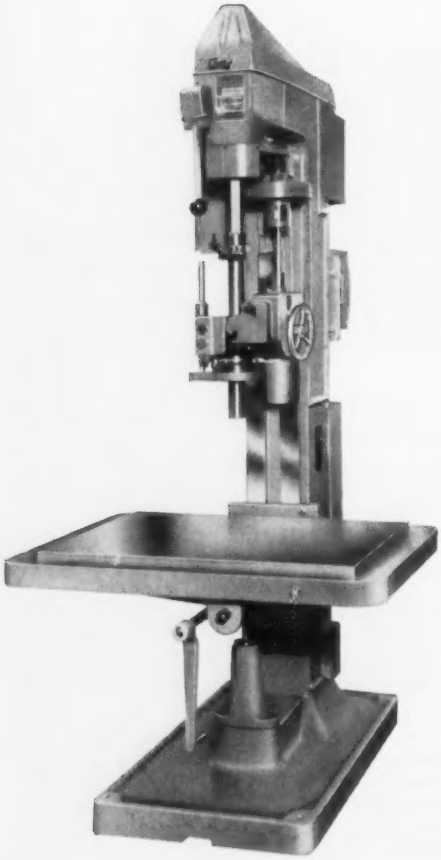
Cogsdill

TOOL PRODUCTS, INC.

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automatic cycle drilling machine



You can chop your time costs with automatic set-ups on this new Avey machine, and still take advantage of the low cost and flexibility of a standard unit.

Adjustable rapid power traverse, feed, and rapid return of the spindle are the features which permit automatic transfer or rotary index fixturing.

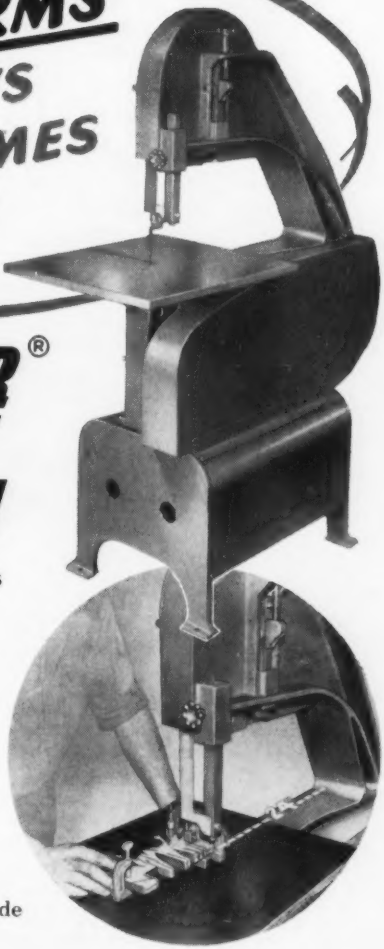
At the same time, you get adjustable feeds, speeds, table travel, head travel, and Avey's advanced spindle construction.

The machine is available with No. 2, 3, and 4 Morse Taper; 1 to 3 HP motors; single or multiple spindles. Your request for additional information will be promptly answered. Avey Division, The Motch & Merryweather Machinery Co., Box 1264, Cincinnati 1, Ohio.

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Bunting®

Alcoa Aluminum Bars



BUNTING BEARING ALUMINUM is the newest metal offered in bar form as a thoroughly good bearing material. Available in 138 sizes of 13" tubular and solid bars, Bunting Bearing Aluminum Bars are in stock now on shelves of Bunting distributors all over America.

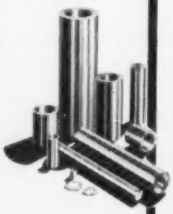
If you are using a low priced bronze bar, this new Bunting Aluminum Bar will meet your need for high quality at low cost. Thus the high quality Bunting Precision Cast Bronze Bar is augmented by the high quality Bunting Aluminum Bar, providing dependable bearing materials covering the entire range of requirements.

Ask your local Bunting distributor or write for catalog and literature.

Other Products Available from your Bunting Distributor

866 stock sizes of Bunting Cast Bronze Bearings and 267 sizes of Bunting Cast Bronze 13" Bars. 667 sizes of Bunting Sintered Oil Filled Bronze Plain, Flange and Thrust Bearings and 84 sizes of Sintered Bronze 6½" Bars. Ask for Catalog 58.

343 sizes of Bunting Cast Bronze Electric Motor Bearings for all motors. Ask for Catalog 258.



ASK HIM

Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars — Bronze and Bearings— Bronze.

Bunting®

BEARINGS, BUSHINGS AND SPECIAL PARTS OF CAST BRONZE OR SINTERED METALS. ALCOA® ALUMINUM BARS.

THE BUNTING BRASS AND BRONZE COMPANY, TOLEDO 1, OHIO
BRANCHES IN PRINCIPAL CITIES

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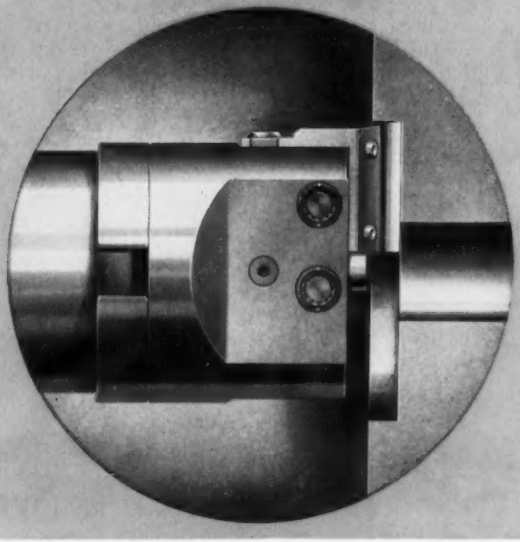
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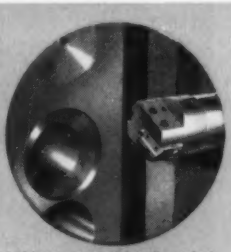
NEW FROM FAIR STREET • HOME OF MICROBORE

microface®

ADJUSTABLE BLADE FACING HEAD

(Patent Pending)





Adapters accommodate 5 standard Microface head sizes for all machines.



Quickly installed and adjusted to .001" on dia. while on the machine.

For boring machines, turret lathes and heavy drilling equipment, this new addition to the Microbore Tooling System bores, faces or spot faces wide surfaces from $1\frac{1}{2}$" to $8\frac{1}{2}$" dia. without special tooling. Often eliminates the necessity of generating faces by slow cross feed methods. Dovetail blade holder mounting in the rugged, one-piece head eliminates chatter, assures consistent accuracy, fine surface finish and prolongs blade life. Adjustment of interchangeable high-speed steel or carbide blades is fast and accurate. *Blades replaceable with a minimum of down time without removing head from the machine.*

Write for technical 4-page brochure.



DeVlieg Microbore® System

DE VLIEG MICROBORE • DIVISION OF DE VLIEG MACHINE COMPANY

Fair Street, Royal Oak, Michigan

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MATTHEWS MARKING MACHINES...

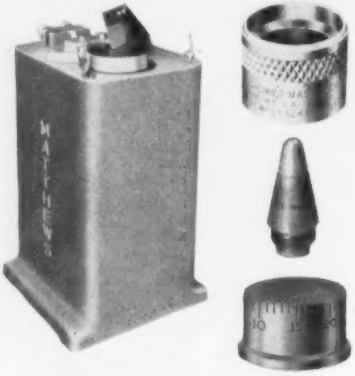
for every industry!

Matthews' standard line of machines reflects hundreds of industrial marking applications . . . light to heavy duty requirements . . . production schedules requiring tens to thousands of marked parts per hour.



NO. 240 GENERAL PURPOSE MACHINE

A versatile unit for heavy or light duty marking on flat, round or even contoured surfaces. The marking cycle may be controlled to a single cycle, or continuous action. "Hydra-Pneumatic" operation provides variable marking pressures from 1200 to 12,000 psi, depending upon the material being marked. The "240" may also be used as a 1200 lb. to 6 TON stamping press.



201 ROTARY MARKING MACHINE

This unit provides high speed marking on a variety of cylindrical or cone-shaped parts . . . of solid or tubular construction. The "201" may be used as an independent marking station, it can be made an integral part of a production line. Self-standing round parts are marked and ejected in ½ second where feed is automatic . . . 3600 to 4000 marked parts per hour when unit is manually operated.

Write today for Catalog 146-C, which completely illustrates and describes Matthews' Marking Machines For Industry.

JAS. H. MATTHEWS & CO.

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"...AND WE ALWAYS SPECIFY STAR BLADES TO SAVE MONEY!"

Your cost accountant may never have seen a power hack saw blade or band saw blade in his life. But he knows the mathematics of metal sawing... first cost, replacement cost, downtime. And the books show that Star Blades are made to cut costs.

Blanks used for Star Blades are sheared from the finest of steels. The machines that fabricate the blades are specially designed by Star and operated by Star-trained craftsmen. It's this unique combination of metals, machines and men that produces a superior blade, one that cuts faster and lasts longer... and saves money.

The Star Distributor nearest you is a good man to know when you're faced with any metal-cutting problem. He carries a full line of Star Hack Saw and Band Saw Blades, and as he's an expert on this subject, he can help you make sure you're always using the right blade ... the best one for getting the job done better, faster and at less cost.

Free Literature on Metal Cutting—Star Metal Cutting Wall Chart—to put up in your shop. Star Metal Cutting Guidebook—tells all about various types of blades and how to best use them.



STAR
Band Saw Blades
in revolutionary
new Reel-Pac Dispenser

— in sizes up to and including 1" — the convenient way to store and handle band saw blades. User simply slides out and cuts length needed. Excess goes easily back into Reel-Pac.

Star makes a full line of Power Hack Saw Blades, Band Saw Blades and Hand Hack Saw Blades and Frames — one for any metal cutting need.

1660

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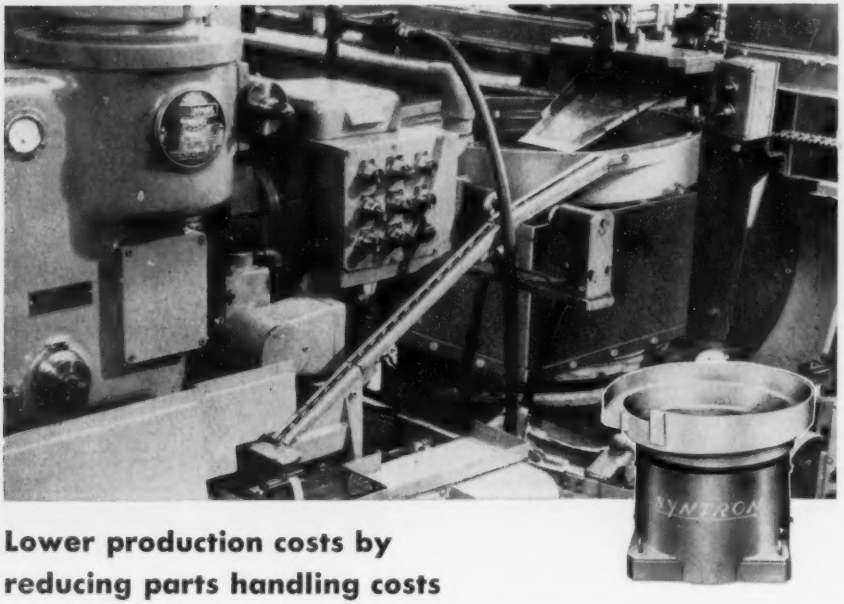
STAR HACK SAW and BAND BLADES

Manufactured by CLEMSON BROS., Inc.
Middletown, N.Y., U.S.A.
Warehouses in Chicago, Denver, Los Angeles & Portland, Ore.

Makers of Hand and Power Hack Saw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines

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SYNTRON Vertical Vibratory PARTS FEEDERS



Lower production costs by reducing parts handling costs

SYNTRON Parts Feeders automatically orient and feed small parts of almost every size, shape and material to automatic machines, such as shown in photo above, at instantly controlled rates of flow to match production line speeds—without breaking or damaging parts. They are easily adaptable to most operations by the use of gravity feed tracks that deposit parts where and as they are needed.

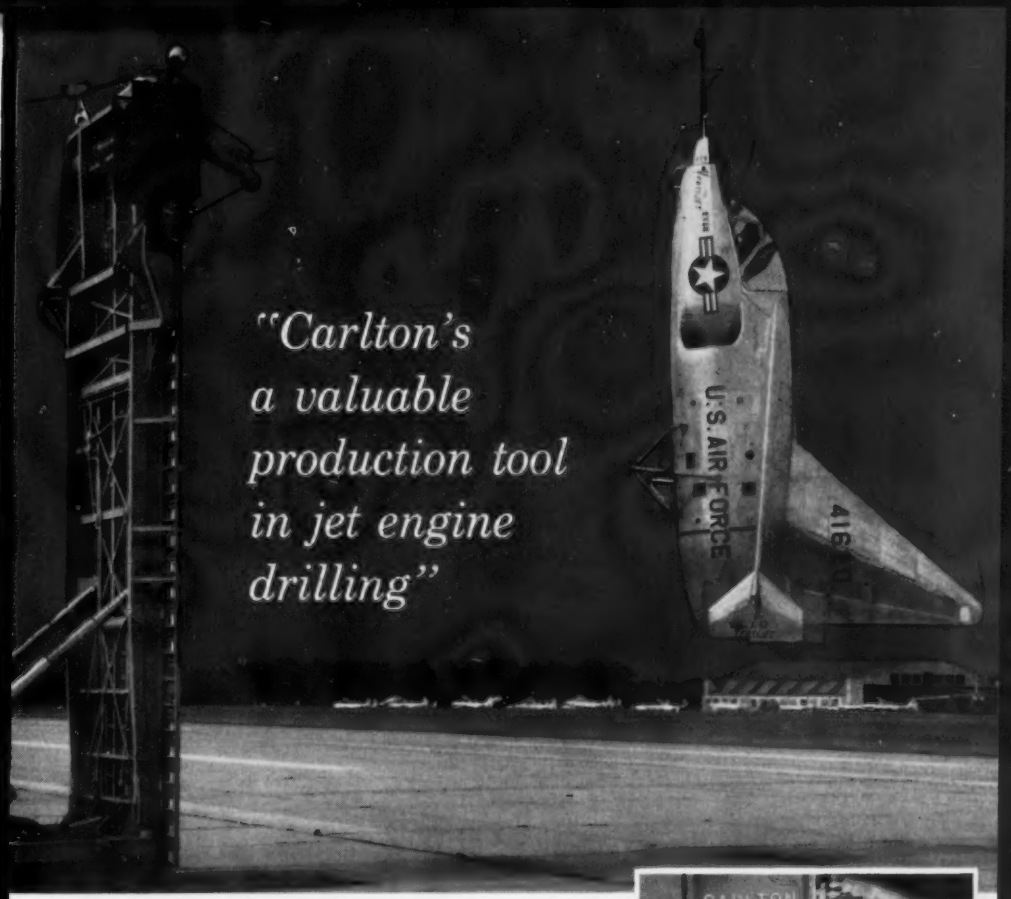
Working on an electromagnetic principle eliminating motors, gears, bearings, and etc.—SYNTRON Parts Feeders assure less down time and lower maintenance.

SYNTRON can help with all your parts handling problems . . .

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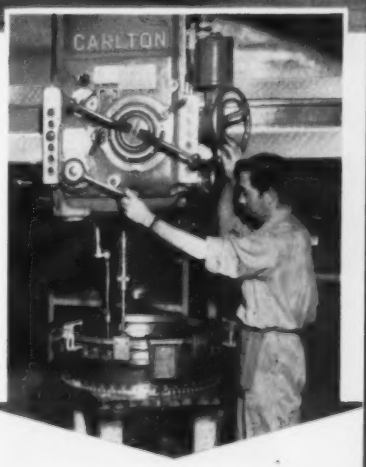


"Carlton's a valuable production tool in jet engine drilling"

Robert L. Clark, Works Manager, Ryan Aeronautical Co., San Diego, has supervised the production of hundreds of Ryan jet engine structures like the sensational Vertijet shown above. He says:

"Carlton is the kind of radial drill you can count on for production hole drilling like the jet engine H-ring (below)."

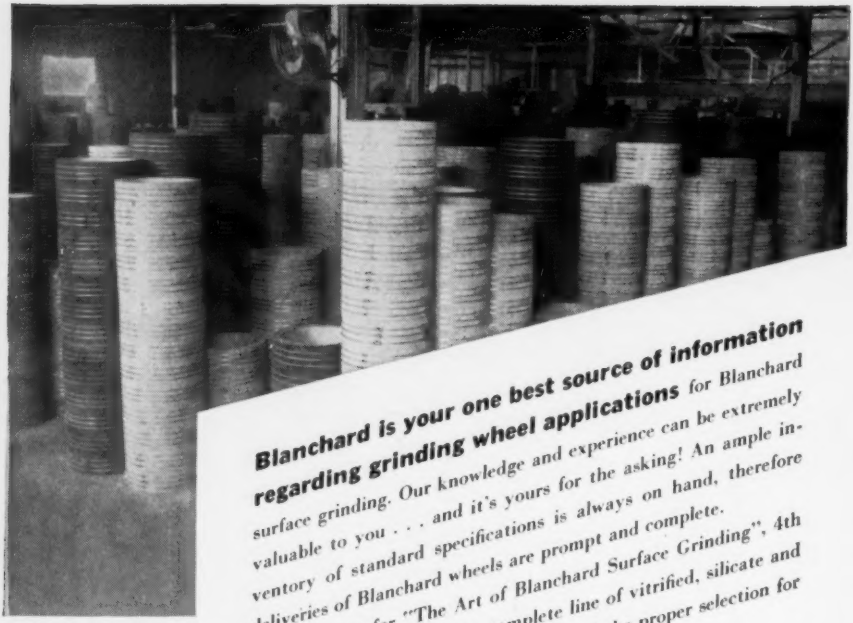
It will pay you to investigate Carlton radial drills for *all* your drilling and boring requirements. Unlimited choice of arm and column sizes and the most modern programming-preselect speed-feed control systems. Write for descriptive bulletins. The Carlton Machine Tool Co., Cincinnati 25, Ohio.



Carlton 3A Radial drills and reams 200 holes in the H-flange of this Ryan jet engine component.

Carlton . . . *specialists in Radial Drills*

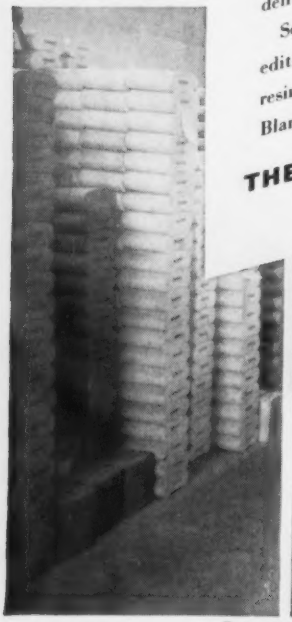
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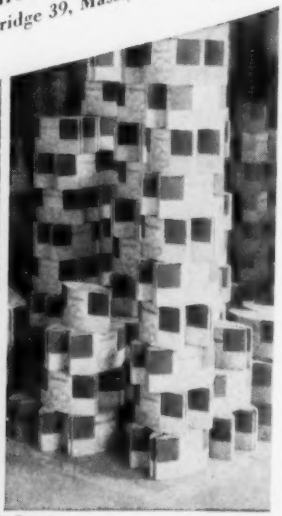
Blanchard is your one best source of information regarding grinding wheel applications for Blanchard surface grinding. Our knowledge and experience can be extremely valuable to you . . . and it's yours for the asking! An ample inventory of standard specifications is always on hand, therefore deliveries of Blanchard wheels are prompt and complete.

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THE BLANCHARD MACHINE COMPANY
64 State Street Cambridge 39, Mass., U. S. A.

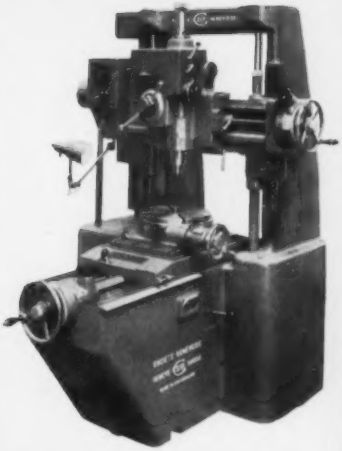






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SIP No. 3K JIG BORING MACHINE
Send for Catalog 1173

Illustrated is the machining of a magnesium casting for an electronic unit . . . (A) drilling, boring and counterboring 37 holes, 62 diameters ranging from 0.255″ to 5.125″ . . . (B) drilling, boring and counterboring 11 holes, 16 diameters ranging from 0.100″ to 0.787″. Here's the record:

MACHINING TIME (A).....8 HOURS, 15 MINUTES
MACHINING TIME (B).....2 HOURS, 0 MINUTES



How's that for Production!

The machine that does it is the SIP No. 3K Jig Boring Machine. It has what it takes—ease of operation, increased generous range and capacity, plus the basic Precision that is SIP—to finish critically sensitive jobs like this so fast and so well! SIP quality and precision cost you no more.

and how's this for Accuracy?

HOLE DIAMETERS HELD TO +0.0004″, −0

CENTER DISTANCES HELD TO +0.00025″, −0

SIP *makes Precision Production Practical & Profitable*

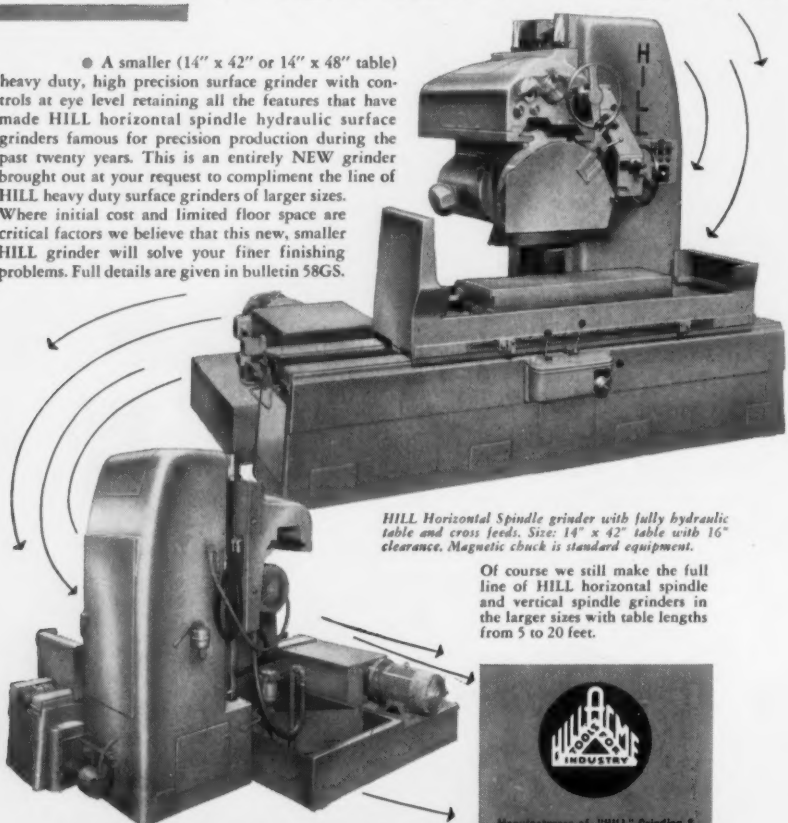
AMERICAN SIP CORPORATION
100 EAST 42nd STREET, NEW YORK 17, N. Y.

Since 1926 all SIP Machines delivered to U.S.A. and Canada have been calibrated in the INTERNATIONAL INCH (1″ = 25.4 mm).

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HERE IS THE GRINDER YOU ASKED FOR!

● A smaller (14" x 42" or 14" x 48" table) heavy duty, high precision surface grinder with controls at eye level retaining all the features that have made HILL horizontal spindle hydraulic surface grinders famous for precision production during the past twenty years. This is an entirely NEW grinder brought out at your request to compliment the line of HILL heavy duty surface grinders of larger sizes. Where initial cost and limited floor space are critical factors we believe that this new, smaller HILL grinder will solve your finer finishing problems. Full details are given in bulletin 58GS.



HILL Horizontal Spindle grinder with fully hydraulic table and cross feeds. Size: 14" x 42" table with 16" clearance. Magnetic chuck is standard equipment.

Of course we still make the full line of HILL horizontal spindle and vertical spindle grinders in the larger sizes with table lengths from 5 to 20 feet.

HILL ACME TOOL CO. INDUSTRY

Manufacturers of: "HILL" Grinding & Polishing Machines — Hydraulic Surface Grinders — "ACME" Forging — Threading — Tapping Machines — "CANTON" Alligator Shears — Billet Shears — "CLEVELAND" Knives — Shear Blades

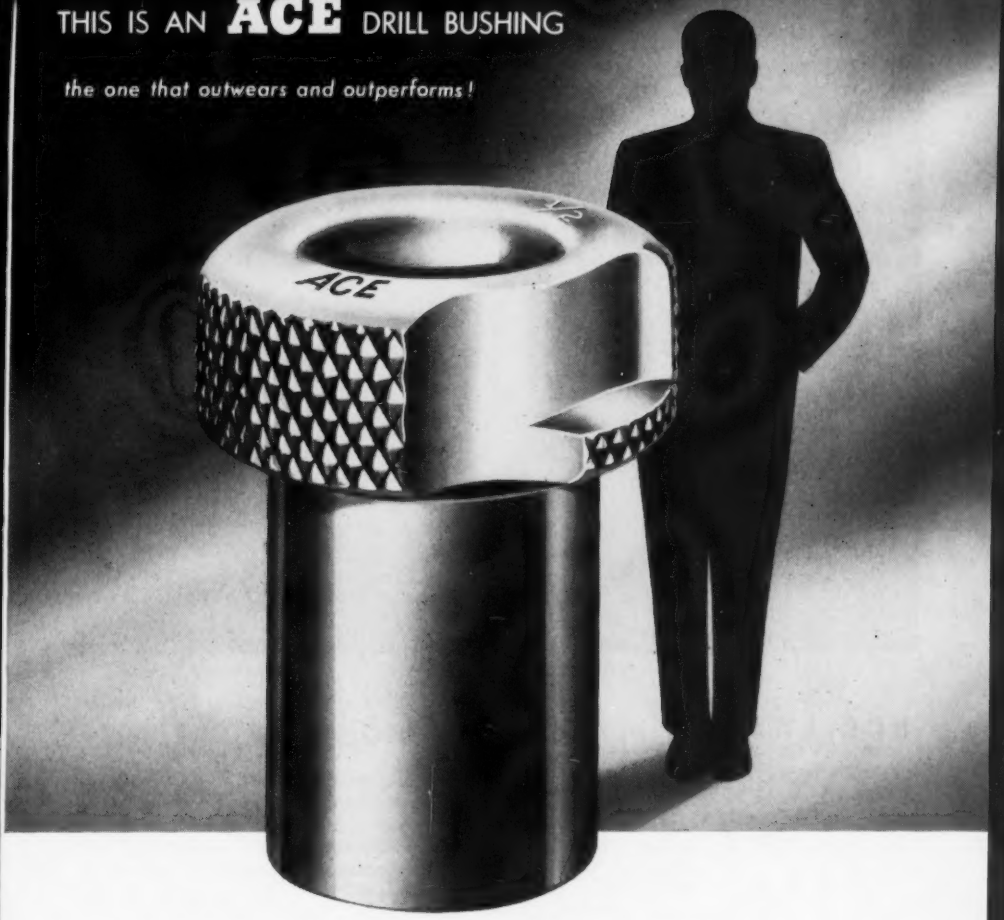
THE HILL ACME COMPANY

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THIS IS AN **ACE** DRILL BUSHING

the one that outwears and outperforms!



IT'S GRATIFYING TO KNOW YOU MAKE THE BEST!

The man who makes Ace Drill Bushings is no Johnny-come-lately. He's not a novice. His bushings last a long, long time. That makes them cost you less.

He cares about quality. Some say it doesn't pay to build stuff too good . . . just get by . . . imply that engineers don't know the difference, but they're wrong. The man who makes Ace Drill Bushings doesn't buy that line.

He makes the best. Doesn't have to offer excuses or alibis. Doesn't have to dodge his customers; they're his friends. He saves them lots of money. He backs every claim with controlled quality . . . His Drill Bushings are consistent — every one the same — you can depend on them.

He sleeps well at night, too — every night — year after year. His customers are happy. He doesn't worry about competition — just goes right on making the very best drill bushings — rolling up bigger and bigger sales.

We're talking about ACE — the DRILL BUSHINGS that are superior. *Try them. You'll see.*

STOCKED, FOR IMMEDIATE DELIVERY BY LEADING TOOLING SPECIALISTS IN YOUR COMMUNITY.

ACE DRILL BUSHINGS

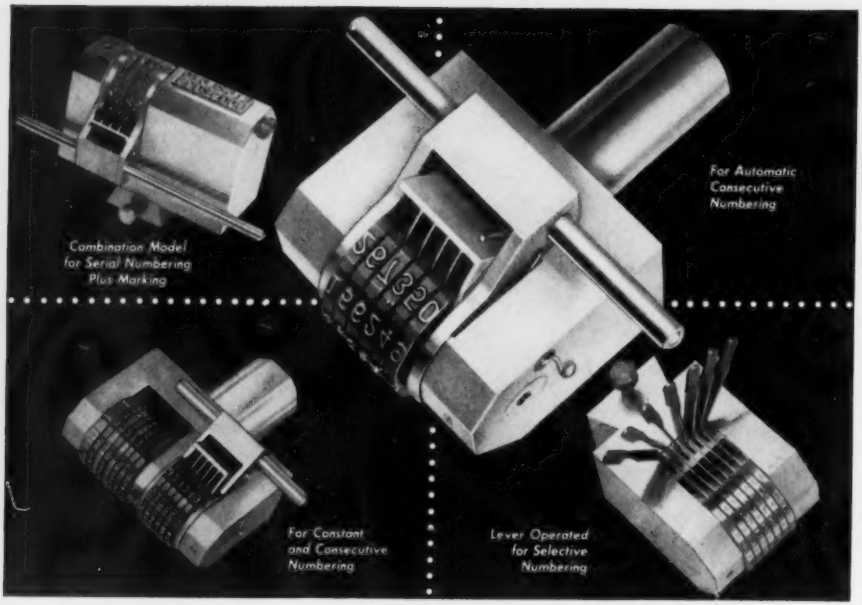
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NOBLEWEST *Precision Numbering Heads*

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1 2 3 4 6 7
1 2 3 4 6 8
1 2 3 4 6 9
1 2 3 4 7 0
1 2 3 4 7 1

Fast, accurate and dependable, Noblewest Numbering Heads are preferred by the leaders in industry. They have unlimited applications for *constant*, *selective* and *consecutive* numbering. Designed for use in either marking presses or Noblewest Roll Marking Machines—wherever permanent numbering is required. Available in a wide variety of automatic, non-automatic and lever operated models with number sizes from 1/40" to 1/2". Special numbering heads are made to any requirements including embossing heads and numbering heads combined with marking dies. Write for new catalog. The Noble & Westbrook Manufacturing Company, 25 Westbrook Street, East Hartford 8, Conn.

A few desirable territories open to qualified representatives

MARK IT BEST WITH

NOBLEWEST IMPROVED MARKING DEVICES

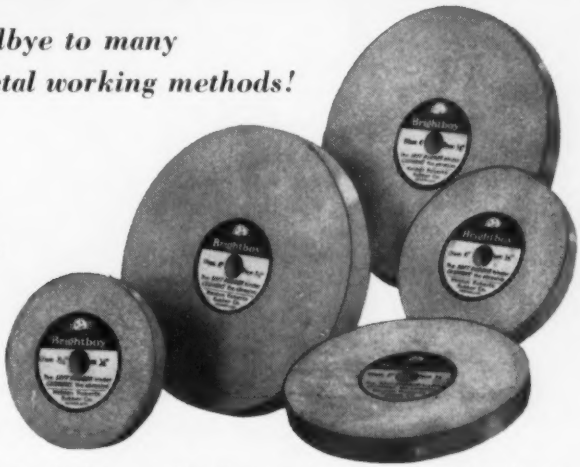
NOBLEWEST

MARKING
NUMBERING
EMBOSSING
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Time-Saving, Modern
RUBBER-CUSHIONED *STOCK* ABRASIVES
Performance-Proved, for Broad, New Applications Never Before Associated with Abrasives

Say goodbye to many older, costlier metal working methods!



Once you try Brightboy, the different finishing medium, you too will welcome enthusiastically the refreshing, new concept which it pioneers in metalworking.

Brightboy's original formulation is the reason for its exceptional time savings and versatility. Its unique action results from abrasive and rubber working together simultaneously, the rubber also "cushioning" the abrasive. Finishing effects, including special surfacing such as damaskeening, are a revelation! Brightboy BURRS, CLEANS, FINISHES, POLISHES, often in a single-step operation. No fuss. No muss.

IMMEDIATELY AVAILABLE! A Comprehensive Line of SERVICE-PROVED STOCK NUMBERS, JOB-MATCHED TO YOUR WORK

The only complete STOCK line of rubber-bonded abrasives. Wheels, sticks, rods and blocks, for machine and manual operations. Silicon Carbide or Aluminum Oxide grains, grades extra fine to extra coarse, in soft, firm and tough rubber binders.

→ ***Write NOW for:***

- **SAMPLE BRIGHTBOY HAND TABLET**
- **CATALOG LISTING GRAINS, TEXTURES, MACHINE SPEEDS**
- **NEW METHOD RECOMMENDATIONS and for name of nearest Brightboy distributor**

WELDON ROBERTS **Brightboy** RUBBER CUSHIONED ABRASIVES

BRIGHTBOY INDUSTRIAL DIVISION
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America's Pioneer Manufacturer of Rubber-Bonded Abrasives

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A PRODUCT OF SKILL

BUTTERFIELD
100%
INSPECTED
TOOLS

the complete line

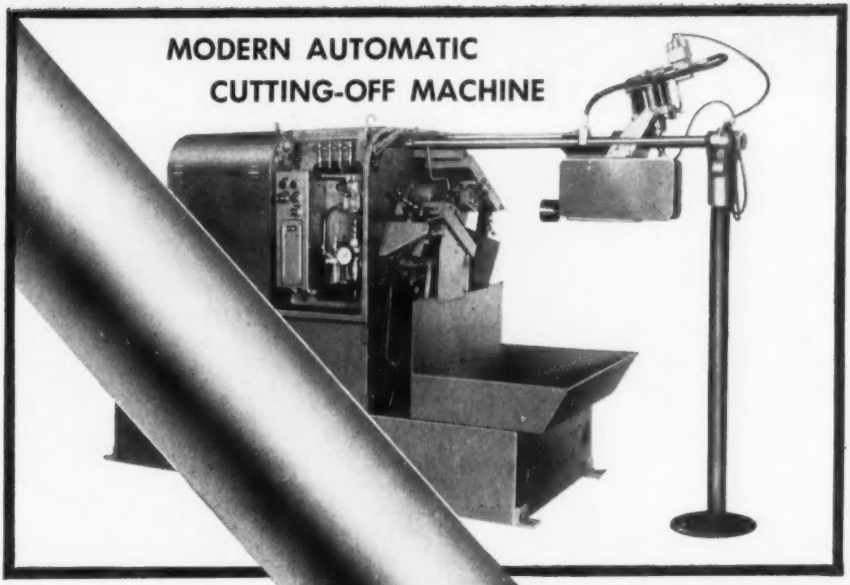
With Butterfield taps, drills, reamers, dies, counterbores, cutters, end mills, hobs and carbide tools, service life is long and delivery time is short. Warehouses in Chicago, Cleveland, Detroit, Fort Worth, Los Angeles, New York and San Francisco. **Call your Butterfield Distributor.**

BUTTERFIELD

BUTTERFIELD DIVISION, UNION TWIST DRILL COMPANY, DERBY LINE, VERMONT

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MODERN AUTOMATIC CUTTING-OFF MACHINE



Fast cut-off in lengths from a fraction of an inch to several feet with micrometer accuracy. Handles any length of stock and cuts any material that can be turned—bar stock up to 3" O.D.—tubing up to 8" O.D. Will cut-off, form, groove, flange and chamfer in a single operation—at a high rate of speed.

CUTS TUBING, PIPE AND BAR STOCK FAST



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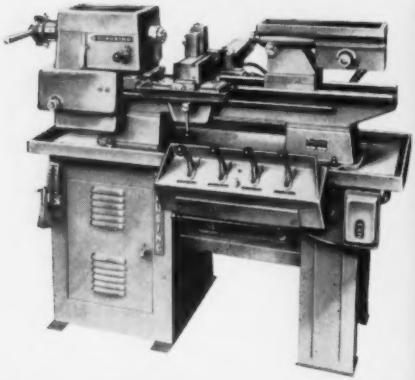
Describes all models. Complete specifications. Shows automatic bar feeder that handles entire load of stock with no operator attention, even with random lengths. Also, hot spinning machines and Safety Drill Tables.

103

MODERN MACHINE TOOL COMPANY
JACKSON, MICHIGAN

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NEW CLAUSING



12¾" swing, 1-1/16" collet capacity, ASA—L-00 spindle nose, "Zero Precision" Timken tapered roller bearings, flame hardened bed ways, ball bearing collet closer, 1½ constant HP two-speed motor.

Hi-Speed (3200 RPM) Lathes with Hydraulic Feeds Variable Speeds

- infinitely variable spindle speeds — up to 3200 RPM.
- hydraulic feeds on carriage, double tool cross slide, tailstock ram.
- each feed is independent and infinitely variable.
- requires minimum of mechanical skill to produce precision parts — feeds are controlled thru levers, positive stops assure accuracy.
- low price includes machine, electricals and hydraulic system — completely assembled, wired, ready for installation.

The new Clausing is a first! There's nothing like it, and its productive capacity is *sensational*. Send for complete details today.

Hi-Speed (3200 RPM) Lathes with Hand Feeds Variable Speeds

- spindle speeds, infinitely variable up to 3200.
- six models, with choice of lathe with six-station Timken bearing equipped bed turret and double tool cross slide . . . with double tool cross slide and tailstock with lever-and-wheel feed . . . or with precision compound and tailstock with lever-and-wheel feed.
- 12¾" swing, 1-1/16" collet capacity, ASA—L-00 spindle, Timken "Zero Precision" tapered roller bearings, flame hardened bed ways, ball bearing collet closer.
- built to rigid specifications for precision performance.
- outstanding in value — low price includes motor and electricals, with machine assembled, wired, ready for installation.

The new Clausings are FAST . . . HIGHLY ACCURATE . . . and LOW IN COST. They'll pay out quickly in your production department, tool room or laboratory. Investigate before you invest in any high speed lathe.



1-1/16" collet capacity hi-speed hand turret lathe illustrated above.
Also available: Clausing hi-speed lathes with ½" collect capacity, spindle speeds from 250 to 3500 RPM. *Prices, with electricals, start at $935 f.o.b. factory.*

CLAUSING

CLAUSING DIVISION
ATLAS PRESS CO.
5-110 N. PITCHER ST., KALAMAZOO, MICHIGAN

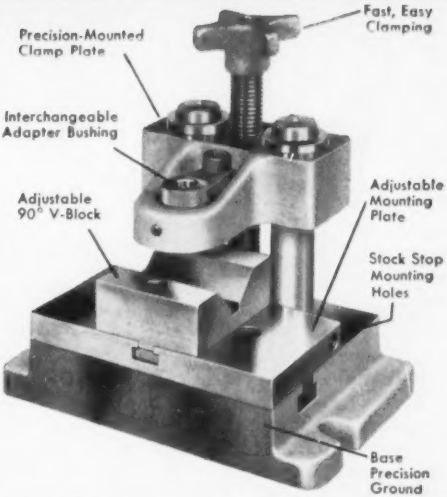
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REPCO *Time-Saving Tools*

ADJUSTABLE V-BLOCK DRILL JIG

Saves Set-Up Time— Increases Output

Here is a versatile and accurate V-Block that makes center and off-center drilling, tapping, and reaming easy and precise. Four-way V-block adjustment simplifies handling a wide range of work. Fast, easy positioning and clamping speed production. A centering locator plug and T-slots in the mounting surface plates assure fast, easy, on-center adjustment. Drill capacity #80 to 5/16" diameter. Handles stock from 1/4" to 2" diameter.

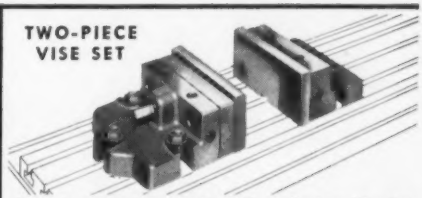


TRUE-CENTER ADJUSTABLE TOOL HOLDER



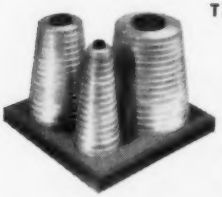
The REPCO Adjustable Holder is a precision-built tool, having two-piece construction which provides fast adjustment of the main body to compensate for as much as 1/2" machine misalignment. Cuts down on tool wear, breakage, and scrap.

TWO-PIECE VISE SET



Save time with this versatile 2-Piece Machine Vise Set. Use as general-purpose vise, angle-block, or separate clamping device. Opening limited only to length of machine base. Light, accurate, rigid. Two sizes: 6" and 8".

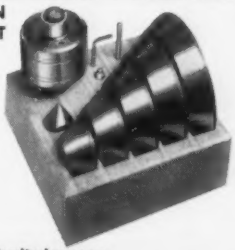
CHUCK JAW TRUING-RING SET



This Ring Set saves time, cuts cost of boring jaws. With correct diameter rings at hand, you gain hours of productive time. Plated rings range from 1" to 4" by 1/16" increments. Handy peg-type rack keeps rings in place.

COMBINATION LIVE-CENTER SET

Heavy-duty live center plus six interchangeable adapters, ranging from a point to 6 1/4" dia. bell. Saves costly set-up and machining time necessary to make large-diameter centers. Straight and various taper shanks available.



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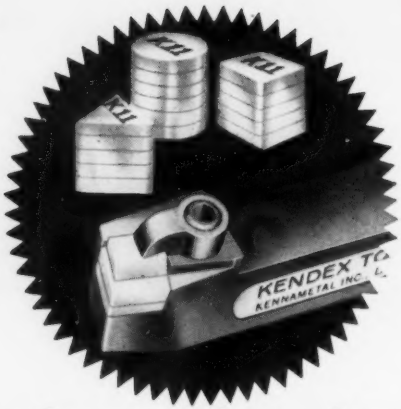
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KENNAMETAL*

K11



A specialty grade in 1955 . . . a production grade today

Created four years ago to provide the greatest possible resistance to abrasion, K11 soon demonstrated exceptional performance in finishing and light roughing of cast iron, alloyed cast iron, brass, bronze, and light alloys. Today, under certain conditions, K11 is also being used for light cuts on steel, as well as for machining unfired ceramic materials, resin materials, and plastics.

With a hardness of 93.0 Rockwell A, K11 is particularly suitable for such precision operations as boring brake drums, machining cam shafts, finishing pistons and sleeves. It is also recommended for die inserts for compacting ceramics, abrasive wheels and other applications involving severe abrasion.

Here are a few examples of K11 "success" stories from many varied applications:

A. Turning SAE 1213 steel rotors . . . At 298 sfm (2550 rpm), K11 increased pieces per insert from 750-1000 to 7500-9000.

B. Machining cast iron . . . K11 averaged 11.7 pieces with .008″ wearland. Best competitive carbide could produce only 9.7 pieces with .016″ wearland. K11 performance thus represents a 3 to 1 improvement.

C. Machining Fiberglass missile parts . . . in tests, K11 provided 15% greater tool life than the best of three other makes of carbides. K11 has now been used continuously on this job for over a year.

D. Finish facing modular iron flywheels . . . K11 increased output from 30 to an average of 100 pieces per cutting edge.

E. Boring welded bracket of 1020 steel . . . K11 is producing 70% more pieces per cutting edge at 100 sfm, .020″ depth and .002″ feed.

K11 is now available from stock . . . at stocked grade prices

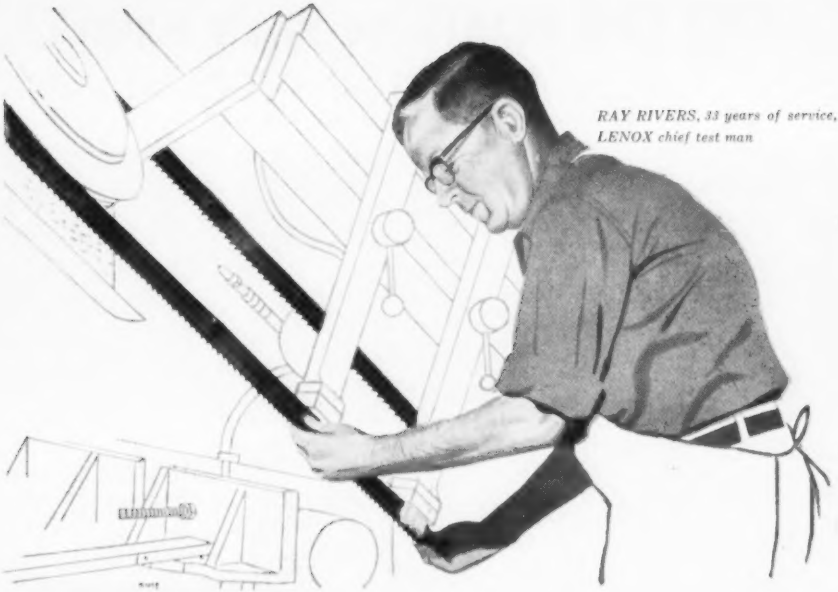
Due to outstanding performance on these and many other difficult jobs, demand for K11 has increased rapidly. To meet this growing popularity, K11 inserts are now available from stocks at Kennametal plants in Latrobe and Detroit. Triangular, square and round inserts with negative rake; also square and triangular inserts with positive rake are being stocked and are available at stocked grade prices, Group II.

For more information about this hard Kennametal grade, see your Kennametal Representative or write KENNAMETAL INC., Latrobe, Pa. 5799

*Trademark

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. . . Partners in Progress

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RAY RIVERS, 33 years of service, LENOX chief test man

LENOX *HIGH SPEED STEEL*

band saw blades

Cut faster . . . take greater feeds . . . last longer than conventional sawing methods, the new *LENOX High Speed Steel* Band Saw Blades assure greater production rates. Recommended specifically for special high speed steel band saw machines, these new Lenox blades have performed successfully on some regular band saw machines. Available in standard and hook tooth design.

PROVEN

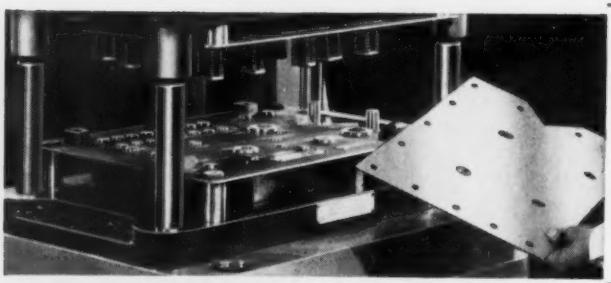




AMERICAN SAW & MFG. COMPANY
SPRINGFIELD, MASSACHUSETTS • U.S.A.

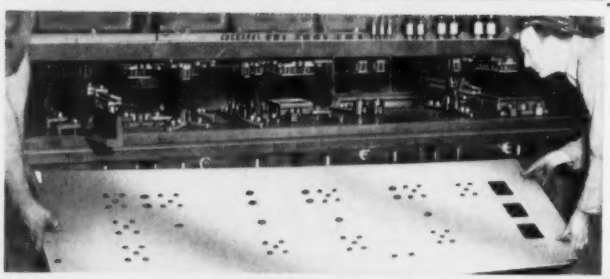
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OVER 2700 PLANTS are saving money with WHISTLER DIES



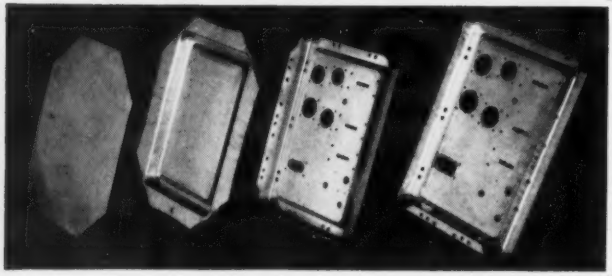
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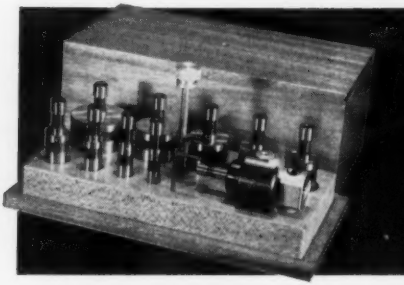
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with an

Adjustable

STYLUS HOLDER

DEFLECTION PROBLEM SOLVED
Compensate for any amount of deflection with a simple, quick adjustment.

MINIMUM DOWN TIME
Eliminate search for matching cutter and stylus. Select cutter, then adjust holder to proper size.

CUTTER COST REDUCED
Prolong cutter life — regrind to sharpen only — size is no factor. Any size cutter performs equally well as new one.

GREATER ACCURACY
Accuracy no longer depends on finding stylus and cutter of exact size. The micrometer screw in the adjustable stylus holder permits controlled stock removal.

MINIMUM STYLII REQUIRED
Nine stylii do work of 70 to 100. In 3 dimensional work, when cutter change is required, stylus need not be replaced.

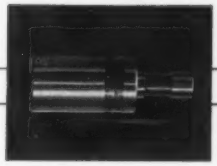
TEMPLATE ERRORS CORRECTED
These discrepancies in template can often be "adjusted out" while cutter is in motion.

9 Stylii will cover complete work range — **9**



70 — 70 or more stylii formerly required for complete work range

CRITERION
TOOL PRODUCTS



CRITERION MACHINE WORKS
765 WEST SIXTEENTH STREET
COSTA MESA, CALIFORNIA

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Rotary Slitters—Product dependability—integrity of manufacture—engineering for specific production needs have all contributed to establish Yoder equipment as the industry standard of excellence. Since 1909 Yoder-built machinery, including Pipe and Tube Mills, Roll Forming Equipment and Rotary Slitters, have earned world-wide customer satisfaction and recognition. Profit from Yoder's years of engineering and service experience. Send today for the illustrated Yoder Slitter Book.

THE YODER COMPANY • 5532 Walworth Avenue • Cleveland 2, Ohio



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Each year, thousands of gallons of worn-out emulsions go down the drain.

With them go millions of dollars that could be saved by controlling bacteria like these Pseudomonads.



Now, ELCIDE 75 controls bacteria... prevents needless emulsion waste!

Bacteria shorten emulsion life. Bacteria enter soluble oil emulsions through the air, water, and normal plant debris. They multiply rapidly, and cause odor, corrosion, and emulsion breakdown.

When emulsions go sour, costs go up. The downtime loses production, and costly labor is needed for the recharging and disposal of the waste emulsion. The additional soluble oil required adds to the total cost.



Bacterial plate counts prove Elcide 75 increases emulsion life. The left plate shows the untreated emulsion. The right plate proves Elcide 75's double control keeps emulsions clean and usable... as much as 5½ times longer by actual plant tests.

Elcide 75 is a powerful combination of Sodium *o*-phenylphenate and Sodium Ethylmercuri Thiosalicylate (Thimerosal) . . . related to one of the safest, most effective bacterial inhibitors used in medical surgery. Its double action controls more bacterial growth than the commonly used germicides and "additives"; yet it is completely safe to employees and machinery.

Just one ounce of Elcide 75 added to each four gallons of standard duty soluble oil emulsion lengthens emulsion life, reduces soluble oil requirements, reduces downtime for recharging, decreases disposal of waste oil, preserves emulsions during extended shutdowns, lessens bacterial health hazards, and reduces bacterial corrosion of machinery and products.

If your company is not one of the many plants now using Elcide 75, we suggest you try it soon. Your own cost analysis should convince you of its value.



ELCIDE 75™
PATENT PENDING

KEEPS COOLANTS FRESH AS A DAISY!

PRICES: ELCIDE 75

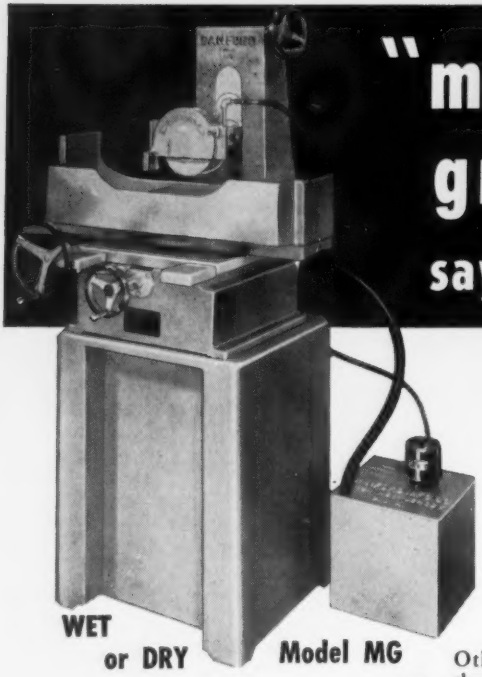
(Lilly's brand of bacterial inhibitor for cutting fluids)

Package	Price per Gal.
1-gal. (4 per case), polyethylene	$8.50
5-gallon, polyethylene	$8.00
55-gallon, stainless steel	$6.50

Sold only through selected distributors.

ELI *Lilly* AND COMPANY • AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION • INDIANAPOLIS 6, INDIANA

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"most used grinder" say customers

WET or DRY **Model MG**

In checking with the tool, die, gage and general production shops that use SANFORD SURFACE GRINDERS, the most frequent comment was that Sanford Grinders were the "most used" of any grinders in the shop.

PARTIAL SPECIFICATIONS—

Capacity — 8″ x 12″ x 12″.
Table travel — 13″, traverse 8¾″.
Vertical clearance 12″ under 7″ wheel.
Standard grinding wheel — 7″ x ½″, 1¼″ hole.
Spindle speed approx. 3000 RPM.
Motor, ½ HP, single or 3 ph., dynamically balanced.
Floor space — 45″ x 38″ x 62″ high.
Net wt. with stand approx. 630 lbs.

Others have tried to copy but there's a "feel" that comes from the precise individual quality and workmanship that goes into every SANFORD GRINDER. It's the factor that can't be found in any other grinder.

So widely used you can ask users in your own area how they like the low priced Sanford Surface Grinder.

Write for illustrated and fully descriptive literature, reconditioning facilities, optional equipment and prices.

Representatives in major industrial areas

SANFORD MANUFACTURING CORP.
1022 Commerce Ave., Union, N. J.

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NEW RANGE OF SIZES

DiaTest

HIGH PRECISION

SMALL BORE GAGE



- **RANGE: .043″ to 1.130″**
- **4 SETS,** fully equipped with rings and measuring heads.
- **READINGS IN .0001″**
- **ACCURACY TO .00008″**

DiaTest checks out-of-round, tapers, incomplete bores and all other variations. All sets overlap in size for complete range.

All parts available separately.

SET No.	RANGE
E-1	.057″— .170″
E-2	.165″— .390″
E-3	.372″— .828″
E-4	.820″—1.130″

ALSO: 3 new measuring heads with range of .043″ to .067″. *(Require special contact needles.)*

*E-2FB	.165″— .390″
*E-3FB	.372″— .828″

*For measuring to the bottom of closed holes. *(Require special contact needles.)*

EACH SET complete with dial indicator.



NEW ACCESSORIES

- **RIGHT ANGLE ATTACHMENT**

Permits gaging without removing work-piece from under bore spindle.

- **EXTENSION RODS**—may be used to length of 30″ without loss of accuracy
- **DEPTH ADJUSTER**—used in conjunction with extension rods, permits gaging to any defined depth.

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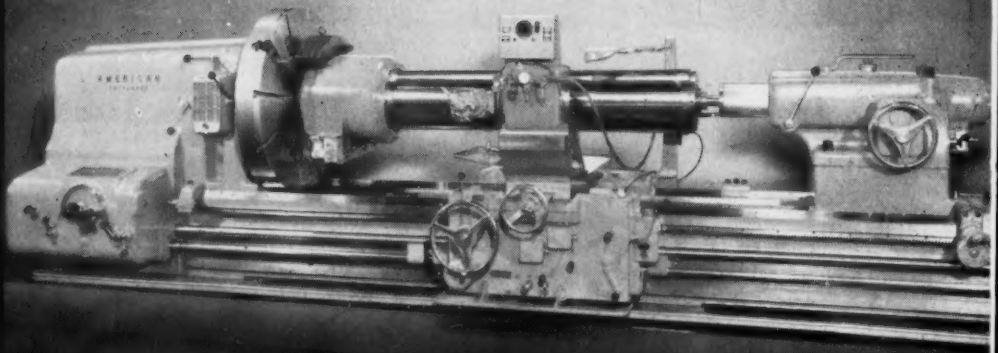
FOSTER SUPPLIES CO.

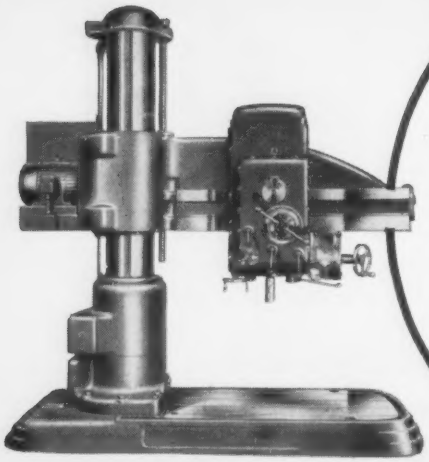
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. . . that Reflects not only LIGHT . . . but QUALITY





All "AMERICAN" Hole Wizard Radial Drill Column Sleeves are now super-finished to a beautiful "mirror" finish.

Not only does this vastly improve the appearance of the machine but which is far more important it minimizes the danger of column cutting and scratching.

This operation is done in our own plant on a brand new 40" "AMERICAN" Pacemaker Lathe equipped with a new No. 4 Gisholt Super-finishing attachment.

This represents just another step along the path of continuous modernization to improve the quality and also the inherent value of "AMERICAN" Lathes and Radial Drills.

Descriptive bulletin No. 328 will be of interest to you. It illustrates and describes many new and exclusive features.

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LATHES AND RADIAL DRILLS

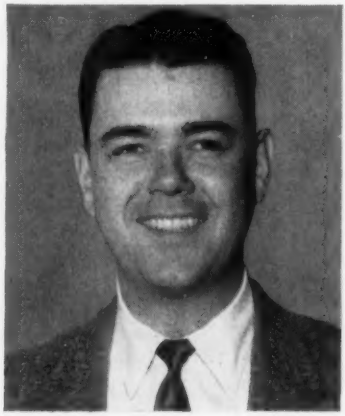
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JERYL L. MARLATT, District Manager . . . serving the Eastern Michigan and Northwestern Ohio territory.

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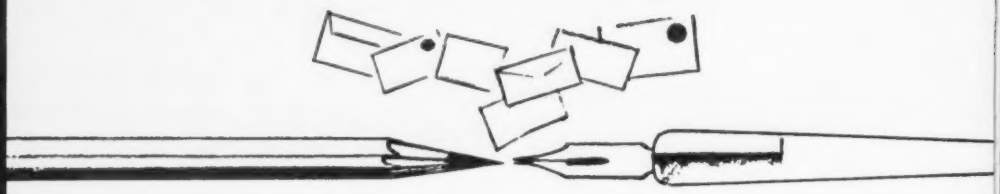
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modern machine shop
431 Main St. Cincinnati 2, Ohio

OVER THE EDITOR'S DESK . . .



MODERNIZATION INCENTIVE

In one of his recent talks, Joel Barlow of the legal firm of Covington & Burling made the following observation: "Canada and other industrial nations of the world have seen the folly of unrealistic depreciation policy. They have finally realized that taxpayers are going to invest in productive facilities only if they can foresee with reasonable certainty that they can recoup their investment. These nations also know, as Uncle Sam must know, that a taxpayer can recoup his investment only once and that a rapid recoupment and reinvestment is absolutely essential to the long-range good and health of this nation of ours.

"There is almost conclusive evidence that an unrealistic depreciation and replacement policy was the undoing of the textile industry. This particular industry could not, or at least it did not, adopt a policy which enabled it to install modern labor-saving equipment which would offset pyramiding labor costs. What was left of it had to be moved where costs were lower.

"Another depreciation tragedy is the decline of the railroads. Railroad management now admits that inadequate depreciation and replacement reserves have left the railroads without sufficient funds to effectively compete with various other forms of transportation.

"The handwriting is on the wall for every industry that is losing out to obsolescence and inflation through inadequate depreciation write-offs. Only through new and improved machines and equipment can any industry get out of the vicious circle which starts with inadequate depreciation. Only under a new and improved tax depreciation policy which must be initiated by industry itself will industry be able to acquire the necessary new machinery and equipment.

And now, if you would care to examine the depreciation practices that are employed in countries other than the United States, we present the following:

Austria: It is reported that an initial allowance of 40 percent may be taken the first year with a standard rate after that of 10 percent.

Belgium: Write-offs average 15 percent annually.

Canada: All depreciable property grouped into classes. Productive machinery and equipment are grouped in a class and can be depreciated at a 20 percent declining balance rate.

EASY MATH. AT YOUR FINGER TIPS SAVE TIME AND MATERIAL

There are many layouts and setups that require calculation . . . your engineering cannot furnish all of them . . . if your workmen are using TRIG-EASY METHODS of calculating then you are "saving time and material" and avoiding trial and error methods. This is money in your pocket!

Using these equation charts you can calculate in higher mathematics. No previous training necessary.



Thousands of these charts used by draftsmen, tool, die and jig makers, machinists, students, inspectors, template makers and designers. **EACH CHART HAS INSTRUCTIONS TO SHOW YOU HOW TO DO IT.**

PLANE ANGLES

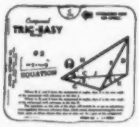
Trig-Easy chart for plane angles and dimensions. (As shown). ⟶

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THREE TRIG-EASY CHARTS for plane, spherical and compound angles. Complete with booklets in container.

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COMPOUND ANGLES

Trig-Easy chart with pocket manual over 140 pages, 60 drawings, 6 decimal trig-function table for compound angles and dimensions in machine set up, etc.

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CURVEASY SET

Two charts with pocket manual of over 60 pages. 50 drawings for section areas and volumes of a circle sphere, ellipse and parabola; cylinders, cone and frustum.

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Trig-Easy chart for spherical angles and dimensions.

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Denmark: An initial allowance system similar to that of England. Apparently 50 percent of the cost can be written off over the first five years. The maximum amount that can be written off for any one year is 33 1/3 percent.

England: 30 percent initial allowance first year plus more rapid subsequent write-offs than in the United States.

France: An anti-inflation system which permits the use of an inflation co-efficient and permits depreciation to be stated on a replacement cost basis. Taxpayers in this country can ordinarily write off their machines much faster than in the United States.

India: In addition to regular depreciation allowances companies have been permitted extras for multiple shift operation and for "development" (new machines). A company working multiple shifts could get a write-off of 52½ percent in three years. As an incentive to modernization, a "25 percent development rebate" permitted a write-off of 125 percent of the cost of the machine.

Italy: Anti-inflation depreciation. Incentive allowances are made for new plants.

Mexico: 10 percent straight line rate.

Netherlands: Initial allowance system with balance determined on a negotiated basis. Most industrial equipment can be written off in ten years.

Norway: New plant and equipment can be written off in a period of five years.

Sweden: Machinery and equipment can now be written off in five years.

Switzerland: 20 percent declining balance rate.

West Germany: Depreciation by negotiation. Machine tool depreciation usually spread over a maximum of ten years, with heavier write-offs in the earlier years.

★ modern machine shop ★

BEWARE

In the mail this past month came a letter from one of our many readers who enclosed clippings from newspapers and magazines describing a variety of current issues. Along with several comments his letter went on to say, "I'm enclosing also a clipping of a couple of editorials from the Wall Street Journal. Under 'Point of No Return' the editor says '. . . Walter Reuther has been urging Washington legislators to . . . spend much more . . . he contends that if Washington will only do that, all problems, including financial ones, will be effectively solved.'

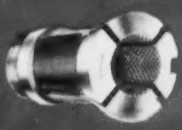
"What the editor overlooked is that Reuther is actually a Communist and is pushing—constantly pushing—the country into a condition of financial chaos, which is one of the first and most important steps in reducing the country to a condition where Communism, in the guise of Socialism labeled as a 'liberal'

3 REASONS WHY SUTTONS ARE THE BEST BUY!

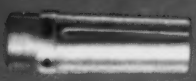
1 Serrations Are DIAMOND-GRIP!

2 Temper and Tension Controlled Heat Assures Uniformity!

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Standard collet for ACME-GRIDLEY, CONE, NEW BRITAIN GRIDLEY, and WARNER & SWASEY AUTOMATIC BAR MACHINES.



Style "L" master feeder with interchangeable and replaceable pads.

COLLETS AND FEEDERS FOR ALL AUTOMATICS!

AUTOMATIC BAR MACHINES
STANDARD COLLETS AND FEEDERS; MASTER COLLETS AND PADS; MASTER FEEDERS AND PADS; FULL FLOAT MASTER COLLETS AND JAWS; COLLET AND FEEDER TUBES; SPOOLS AND BUSHINGS

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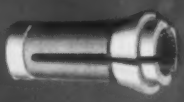
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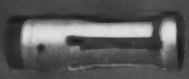
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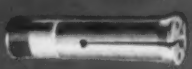
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Sutton Tool Co.

Dept. MMS5 Sturgis, Michigan

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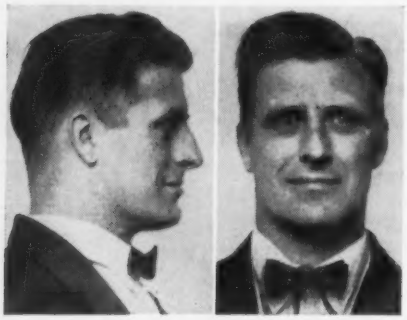
government can be placed in control. In other words, to make our government by the proletariat—a complete control of the United States Government by means of the labor unions. When that is accomplished, Mr. Reuther figures that he will become president.

"Michigan has gone broke because its governor has followed Reuther's line; that should be enough to show the people what will happen if our Congressmen continue to follow his advice—as many of them are doing now.

"A vast proportion of the union workers would feel that they had 'arrived' if they could just get Reuther elected to the Presidency, and get a majority in Congress of Congressmen favorable to or under obligation to the unions. What they don't realize is that eventually all prices and wages would be controlled by the Government, and there would be no more wage increases without Government sanction. Under price controls of this nature, if a business man couldn't make a profit, he would have no alternative but to go completely out of business."

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Wanted by FBI



CARL MATHEWS, also known as Carl Matthews, Carl Mathew; Unlawful Flight to Avoid Confinement—Robbery.

Carl Mathews, reportedly, is an excellent welder and is proficient at engraving and machinist work. During his confinement in prison he instructed other inmates in these trades. He is being sought by the FBI for Unlawful Flight to Avoid Confinement for the crime of robbery.

Carl Mathews was convicted of armed robbery and kidnapping in Mt. Clemens, Michigan, on June 2, 1941, and was sentenced to life in prison. On June 13, 1953, he escaped from a Michigan prison. Complaint was filed, and warrant issued in U. S. District Court at Detroit, Michigan, on August 13, 1956, charging Mathews with Unlawful Flight to Avoid Confinement for robbery. Mathews has been convicted for armed robbery, kidnapping, burglary and auto banditry. He has been known to carry firearms and should be considered armed and extremely dangerous.

Description: Age 48; born March 11, 1911, Franklin County, Indiana; height 5 foot 9½ inches; weight 148 pounds; build medium; hair brown; eyes hazel; complexion medium; race white; nationality American; occupations, welder, engraver, farm laborer; scars and marks, small cut scar at right corner of mouth, scar on inside of first joint of index finger, left hand, scar on inside of first joint of right finger, right hand. Any person having information which might assist in locating this fugitive is requested to immediately notify the Director of the Federal Bureau of Investigation, United States Department of Justice, Washington 25, D. C., or the Special Agent in Charge of the nearest FBI Division, the telephone number of which can be quickly and easily found on the first page of your telephone directory.

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Facts About explosive Metal Forming

Research work conducted by Aerojet-General Corporation indicates brilliant future for new process in space age production.

By GILBERT C. CLOSE
Field Editor, Modern Machine Shop

To the average shop man, the forming of metals by the use of directed forces generated by an explosive charge may seem new, revolutionary, and just a bit startling. To the explosive engineer, this new process is merely another branch on a huge tree of processes that has grown up in the past half-century, with its roots firmly planted in the art and science of directed explosive forces.

To get the "low down," so to speak, on this new process for readers of *Modern Machine Shop,* this writer decided to visit Aerojet-General Corporation, a subsidiary of the General Tire & Rubber Company, at Azusa, California. This company's Explosive Ordnance Division, headed by some of the nation's top explosive experts, and employing unsurpassed explosive laboratory facilities, has been engaged in research on explosive metal forming for more than a year. These are the same experts and facilities used in designing and developing the warhead for the Army's Nike-Hercules missile, the exploding bolts which separate the various stages of the NASA-Air Force Lunar Probe vehicles, and numerous fuzing systems. Other contributions include safety techniques for arming various missiles, high quality explosive loading methods, and intensive studies on the effects of high temperatures on explosives. In all, more than 100 man-years of previous experience with explosives, all on a high technical level, are being poured into the research on explosive metal forming.

"We are tackling the problems

involved on a quantitative basis," explains Dr. Louis Zernow, head of the Ordnance Division's research department. "This pertains especially to the design of the explosive charges employed and to the plastic deformation processes involved. Explosive charges are first carefully calculated, then the calculations are checked experimentally, and the plastic deformations are measured very carefully for comparison with predictions."

In explaining why Aerojet-General Corporation entered the explosive metal forming field so intensively, Guy C. Throner, manager of the Ordnance Division, literally described the expected advantages of the new process as follows:

"Aerojet-General has been called 'the General Motors of the Rocket Industry'," Throner said, "Our prolonged experience in this work warned us that the increasing size of the newer missiles and the requirements for higher-strength materials are rapidly generating a serious fabrication problem. Many conventional methods of fabrication have almost reached their limits when considered in relation with tooling costs. We felt an urgent need for a new process which could form a limited number of very large parts out of the new and exotic materials, and do it at a relatively low tooling cost per part. We decided that explosive metal forming, if thoroughly researched and practically developed, could fill this bill!"

Explosive metal forming at Aerojet-General is still largely in the experimental phases, although explosive trueing or coining of parts produced by conventional forming methods is now being practiced on a limited production basis. The work is being accomplished at the company's ultra-modern Chino Hills Explosive Research Laboratory, near Los Angeles. This facility includes a camera capable of making 2,400,000 exposures a second, a series of flash X-ray machines which deliver consecutive X-ray bursts which last one ten-millionth of a second, and a Raster ocsilloscope for measuring the progress of shock waves within an explosive charge. This later instrument is capable of



Sequence 1 of 5—Technician places blank to be formed over the bowl-shaped metal mold.

"Fundamentally, the only tooling required is a female die of the proper size and shape . . ."



Sequence 2 to 5—He then fastens explosive above blank and secures both to the mold.

measuring to within 20 milli-microseconds, which is equivalent to 20 billionths of a second. With it, the progress of shock wave development within an explosive charge can be measured. This data is extremely useful in designing specific charges for different types, sizes, and shapes of forming work.

"We'd like to emphasize that explosive forming is definitely not a backyard project," Dr. Zernow said, "and should be attempted only by those thoroughly versed in explosives, with proper equipment, and thoroughly familiar with the safe handling of explosive charges. We'd dislike very much to think that we gave out information that would in any way cause death or injury to anyone."

Throner emphasized this point by stating that safety in explosive forming work is not implied by 10 or 100 successful shots, but by continuous success in continuous production with no more hazard involved than is present under conventional production conditions.

While the principle of explosive forming is very simple, the actual techniques employed are quite complicated, and continue to complicate as part size and shape complexity increases. Fundamentally, the only tooling required is a female die of the proper size and shape into which the flat blanked part material is driven by the force of the explosion. The need for a male die is entirely eliminated, as is the need for costly pressure application devices. The female die, of sufficient strength to withstand the number of shots to be fired in producing the required number of parts, is sometimes reinforced by a concrete backing; then the die and its backing are mounted on a conveient handling platform.

In preparing for a test shot, the blank to be formed is placed over the female die, then the air between the blank and the die is partially evacuated. Next, a carefully designed explosive charge is mounted a predetermined distance above the center of the blank. The entire assembly is then lowered into a large tank of water and the shot is fired. Pressure from the explosion, which

"Charge design is influenced by each different part shape and size and by the material involved."

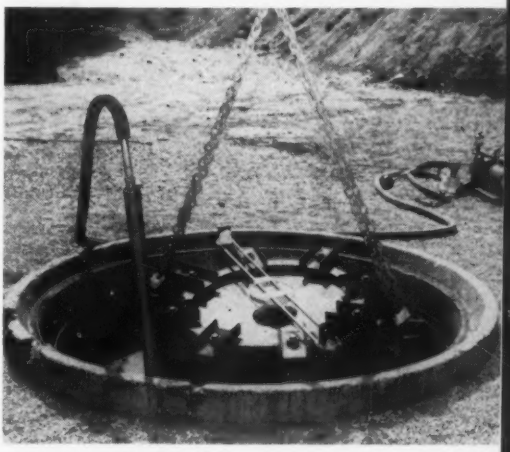
can range all the way from a relatively few p.s.i. to a million or more p.s.i., is transmitted through the water to the surface of the blank, forcing it smoothly into the female die cavity.

But the simplicity of this actual explosive forming operation derives only after application of a vast amount of technique knowledge and know-how. First, a competent metallurgist must consider the properties of the material to be formed and the pressure that will be required to form it. Secondly, an experienced explosive engineer must design a charge which will deliver the pressure as required. Charge design is influenced by the pressure required, the shape and size of the part, the material being worked, and the depth at which the charge will be exploded — this latter because the forming pressure generated by the original explosion is ultimately relieved by a rarefraction wave bounced back from the surface of the liquid medium in which the explosion occurs.

There is as yet no general tabulation of data available on the design of charges for explosive forming, and Dr. Zernow points out that any such data that is tabulated in the near future will need to be interpreted by an experienced explosive engineer. Charge design is influenced by each different part shape and size, and by the material involved.

"In addition to providing safety, this is another reason why we state that no one should attempt explosive metal forming minus the services of a qualified explosive expert," Dr. Zernow says.

From the metallurgical standpoint, many materials react in strange ways to the impact of explosive forming. Fortunately, most of these reactions are advantageous. For instance, many metals that are too brittle to form by conventional methods may be successfully explosively formed. A complete theory to fully explain everything that happens is not yet available. It has been suggested that the rate of deformation during forming is so rapid that localized necking which would normally cause rupture does not have time to develop very far. The pressure on the workpiece during defor-



Sequence 3 of 5—The entire unit is lowered into a tank of water; the pipe and hose shown at the left are attached to the mold and are used to create a partial vacuum within.

"Explosive forming shapes the blank material with such speed that springback is reduced . . ."

mation is also believed to help prevent fracture.

A phenomena undoubtedly related to the above is that metals which require several intrim annealing heat treatments during conventional forming can be explosively formed in a single shot. In actual tests conducted at Aerojet-General, it was found that a stainless steel part which required seven heat treatments when formed by conventional methods could be successfully explosively formed in a single operation.



Sequence 4 of 5—Submerged explosions sends a geyser skyward, as depicted in this view.

Tests conducted at the company's Chino Hills Explosive Research Laboratory indicate that almost any metal may be successfully explosively formed. The more exotic materials worked with to date include Tricent (boron steel), Vasco-jet 1000, titanium, AMS 6434 and other nickel chrome, stainless, cold and hot-rolled steels.

In explaining the variable utility of the new explosive forming process, Irv Lieberman, Project Manager, has this to say . . . "We have found no gauge limitations and have worked with materials from 0.012 to 2.0 inches thick. In many applications, there is no evidence of the drastic thinning which occurs during conventional forming processes. On the contrary, as this fabrication method moves metal into place, it tends to thicken rather than thin walls."

Two other important advantages which Lieberman cited are reduction of springback and work hardening. Explosive forming shapes the blank material with such speed that springback is reduced and the metal retains its new form. Some work-hardenable materials exhibit almost identical physical characteristics after forming as before and minus any annealing heat treatment.

In summarizing the probable major uses for explosive metal forming, Dr. Zernow stressed these three fields: (1) for forming very large parts where conventional forming equipment of the size required is not

available or would be extremely costly; (2) for forming unusual and exotic materials which cannot be formed by conventional methods; and (3) for forming limited production runs where the number of parts involved would not justify conventional tooling costs.

The most sharp-etched indication to this writer of the scope of the research work now being accomplished at Aerojet-General was the reluctance of those in charge of the project to make flat statements and claims regarding results. Results, while generally good, vary with different materials and cannot be encompassed in a general statement. And as yet a lot of ground must be covered before all materials have been explosively formed in all shapes, sizes, and gauges.

But both Dr. Zernow and Guy Throner are certain of one thing—explosive metal forming has a brilliant future in space age production. Their only fear at this time is that too many unqualified, backyard experimenters will "blow themselves up" before this future arrives.



Sequence 5 of 5—The smoothly configured bowl-shaped material formed by the underwater explosion is removed from the mold.

"Please warn the readers of *Modern Machine Shop* that explosive metal forming is definitely not a backyard, water-bucket project," Dr. Zernow insisted. "Their only contribution to the science will be a 'black eye' in regard to its safety!"

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"Power Press Safety Manual" is the title of an information-filled handbook published by the National Safety Council. A 96-page reference work containing 45 illustrations, the manual was written by members of the executive committee of the Council's power press and forging section. It covers power presses from basic construction to maintenance, with chapters on why a power press guarding program is necessary, the functions of power press parts, training, maintenance and automation.

Further information on "Power Press Safety Manual" and quantity prices may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Illinois.

LET AN AUTHORITY TELL YOU



How to Solve Your Supervisory Problems

By ALFRED M. COOPER
Contributing Editor, Modern Machine Shop

Q. Why is so much emphasis being placed on reducing labor turnover at this time?

A. Because we are entering a new era of labor shortages, which always accompany an upturn in production and the resultant improvement in national prosperity.

Q. To what extent is management's augmented interest in reducing labor turnover connected with our arms race with Russia?

A. To a very considerable extent. With Russia demonstrating unsuspected powers of converting her industries into an extremely capable machine for the production of weapons of offense and defense, American management is now fully aware that our own worker morale must remain high and show yet further improvement. This is true, since under our system of free private enterprise compulsion cannot take the place of willingness to turn out the best work of which the employee is capable. *And in a period of full employment labor turnover is one of the most reliable barometers of worker morale in any American plant.*

When jobs are plentiful the worker whose morale is unsatisfactory is likely to look about for another job, even though the new job pays no more money and probably is in a plant where working conditions are no better.

Q. What are some tested methods of reducing labor turnover and absenteeism rates during a period of full employment?

A. Most executives and supervisors agree that turnover is essentially a manifestation of employee morale, and whenever turnover increases sharply the cause is to be found in (a) employee dissatisfaction, (b) lack of interest in work, or (c) improper supervision.

Since satisfaction and interest are factors largely influenced by the quality of supervision the employee receives, these three reasons could, by over-simplification, be lumped together under the last heading. But such action would not be wholly fair

For answers to your perplexing managerial problems address your letters to: Mr. Alfred M. Cooper, MODERN MACHINE SHOP, 431 Main St., Cincinnati 2, Ohio.

to the supervisor, since there are certain elements influencing both interest and satisfaction that are not wholly under his control.

Nevertheless, when turnover rates start climbing, the supervisor should make a quick mental check of the factors affecting employee interest and satisfaction and decide if it is within his power to improve these.

The supervisor cannot, as a rule, adjust rates of pay, except by recommending deserving employees for promotion—possibly to supervisory work. Neither can he always better working conditions, except again by recommendation. *And these are the two major elements in employee satisfaction.*

Sometimes the supervisor *can* spot unnecessarily onerous working conditions and do something constructive about these. His solid background as a craftsman helps here, since he does not have to use much imagination to put himself in the worker's place and figure how *he* would react to working conditions that are unnecessarily restrictive.

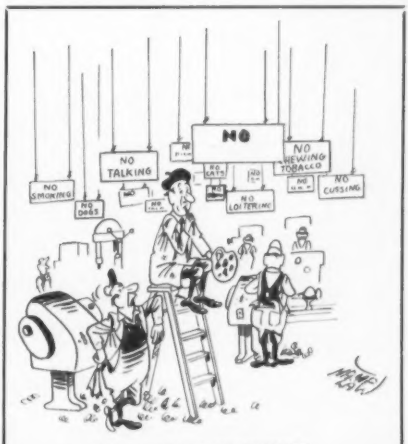
When it comes to increasing the employee's interest in his work, however, the supervisor has far more leeway. Any consideration of the factors which are known to affect interest (craft pride, praise for exceptional effort, desire to show off, competitive spirit, liking and respect for his boss, et cetera) proves at once that the immediate supervisor has the power directly to enhance or impair these. Unfortunately, it is true that this supervisor can do the latter unintentionally, without appreciating the devastating interest-killing effect of some thoughtless phrase or act of his.

Q. How may the supervisor reduce turnover by consciously utilizing interest factors?

A. The only sure method here is to keep all of the interest factors in mind, and the supervisor must constantly check his speech and actions against these. He cannot depend upon employee reactions as a guide, because these people often have the faculty of concealing their feelings. But concealed dissatisfaction or lack of interest will result in quitting, malingering, or general slow-down just as surely as will the overt variety of either.

The truth is, there is often little to choose between in the matter of either wages or general working conditions of two given plants, at either of which the efficient artisan may readily find employment. The difference, as proved by every survey that has been made of employee morale, lies in the worker's relationship *with his immediate supervisor.*

Frequently, this single factor determines the rate of labor turnover existing within any organization.



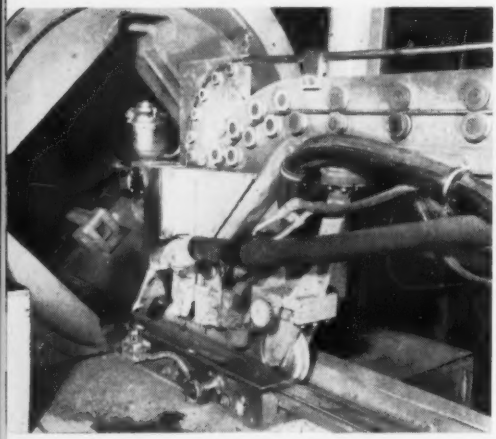
"How about NUTHIN'?"

Welding Locomotive Traction

Operation involves joining four lengths of special heavy rolled steel section at edges by internal and external welds.

By H. E. SCHNEIDER
Plant Manager, Plant Two, Electro-Motive Division, General Motors Corporation, Chicago, Illinois

Magnetic portions of frames for electric traction motors, used in locomotives built by Electro-Motive Division, General Motors, at its La Grange, Illinois plant, are heavy weldments. These frames are fabricated in Plant Number 2 of the same Division in Chicago, using, for each motor frame, four identical lengths of special rolled section produced from S.A.E. No. 1010 mild steel.

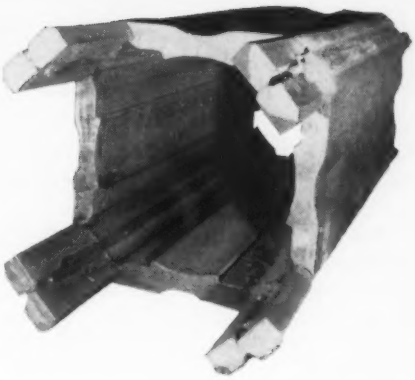


Setup in which a boom welder is applied to produce four longitudinal internal welds in traction motor frame. An indexing fixture resting in rings is supported on a carriage to traverse weldment over fixed boom.

When assembled by welding, a typical frame measures 23¼ inches I.D. at the cylindrical portion of walls close to which the armature turns. Assemblies are produced in 60-inch lengths. After complete welding, each assembly is flame cut into three 20-inch lengths. It is important that each frame have good and uniform magnetic properties, as they affect the magnetic field of the motor and have a significant bearing upon motor performance. Rolled steel is dense and free from porosity, fulfilling well all requirements for frame components.

For various reasons, the rolled section is not designed with uniform thickness. Four lengths of this section are used in making each frame, these being so placed that machined edges are brought together for welding. Most of the interior walls then are in a cylinder surface forming the bore. Where each of the four welds comes, however, there is an interior recess and exterior bulge. At these joints, total radial thickness before welding is 2⅜ inches.

Edges of the rolled slabs to be joined first are machined so that when the edges are brought together for tacking they bear along flat



Weldment produced by the Electro-Motive Division for use as a frame for a locomotive electric traction motor, utilizing four lengths of heavy special rolled section steel. Internal and external longitudinal welds made at each corner join the four pieces together.

radial surfaces 5/8 inch wide and as long as the slabs. At each side of this face, there is a 30-degree bevel face, leaving a 60-degree weld groove at each side of the butting faces. In each such joint, a weld bead has to be laid down in such a way that penetration will cause complete fusion along the narrow mating faces. If this is not done, undesirable magnetic variations at the joints will result.

As each inner groove is 11/16 inch deep and each outer one is 1 1/8 inches deep, the weld beads needed to fill the grooves have sizable sections. In most welderies, beads would be produced in multiple passes. Such passes are avoided wherever possible in the Electro-Motive plants, however, largely because porosity and possible small slag inclusions may occur, despite care in cleaning between passes. Such cleaning also involves extra labor not needed when a single-pass weld is made.

For a single-pass automatic submerged arc weld of large section, however, somewhat special setups are needed and head travel must be slow enough to provide for filling the groove. Such welds are made, however, by using the proper size and number of electrodes and by supplying sufficient current at proper voltage, as described below.

After the four sections of a frame have been tack welded in correct relative position and runout plates have been applied, the assembly is placed in a fixture on the carriage of a boom welder for making internal welds in the 60-degree grooves 11/16 inch deep. At the end of the boom are guides for two electrodes arranged in tandem in the groove, spaced 3 inches apart. Close to the electrodes is a hopper holding enough granular flux to cover the weld over its full length. Electrodes are fed from two Lincoln Electric LAF automatic submerged arc heads adapted for mounting on the fixed boom support. The electrodes pass via insulated tubes along the boom and through copper guides supplied with current from motor-generators of large capacity.

In this setup, the leading electrode is of 1/4-inch diameter and receives 1400-ampere alternating current and the trailing electrode, of 5/32 inch diameter, receives 1000-ampere direct current. Welding is done at a speed of 16 inches per minute, this being, of course, the speed at which the carriage moves along its track, advancing the fixture over the boom.

". . . 2300-ampere alternating current is supplied to the wire that is fed by a single arc head."

A vacuum tube picks up flux that is not fused.

For convenience, the fixtures employed in making both internal and external welds support the weldment in rings at each end. These rings rest on rollers and are indexed either 180 or 90 degrees between successive welds to bring the grooves to be filled with weld metal below the electrodes successively. After the four internal welds are completed, the weldment is transferred to the welding machine for making the four external welds in 60-degree slots that are 1⅛ inches deep and so require beads of still larger sectional area than those in internal grooves.

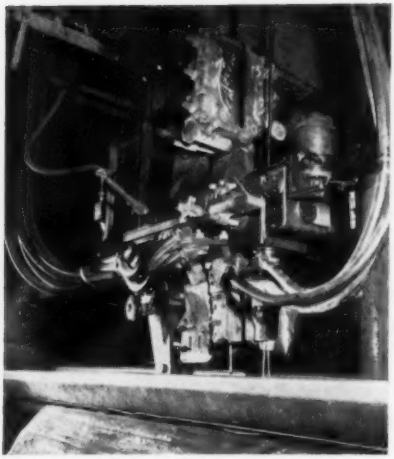


General view of setup that produces heavy single-pass longitudinal welds along four external corners of each motor frame while it is air clamped in fixture. Flux to cover the two arcs is held in a trough above weld.

Before welding, the weldment is air clamped in the fixture having end rings resting on rollers above the carriage. Both heads are supported from a fixed overhead structure but the carriage moves the weldment longitudinally at the rate of 10½ inches per minute while each weld bead is being laid down.

At the top of the fixture is a flux trough having a central slot whose edges rest against the weldment at each side of the groove for the weld but well back away from groove edges. Granulated flux is fed through hoses into the trough, filling the weld groove and space above it to a sufficient depth to keep the arcs fully covered. A suction hose picks up unfused flux after each weld is completed.

To supply weld metal at a high rate, a leading electrode wire of ⅜-inch diameter is used and 2300-ampere alternating current is supplied to the wire that is fed by a single arc head. For the two trailing electrodes a Lincolnweld Twinarc head is used and feeds two ⅛-inch wires. They are supplied with 1100-ampere direct current. All three electrodes are in tandem and traverse the groove simultaneously. Although there are two arcs, they are close enough to produce a single continuous bead and the high current density insures deep penetration, just as for the inside welds made previously. This penetration has to be



Close-up of the two automatic welding heads. The leading head, at left, feeds a single 3/8-inch electrode wire, supplied with alternating current, and that at right produces a twin d.c. arc, feeding two 1/8-inch wires that travel in the same slot. The three electrodes produce the weld in a single pass.

sufficient to fuse the 5/8 inch of metal initially between the two grooves.

Application of direct current to the trailing electrodes yields a weld bead of better surface finish than if alternating current was supplied to both heads. Although the heads are fixed against longitudinal motion, they are arranged to float sidewise and vertically, their weight being taken by a wheel having a tapered face that runs in the welding groove to keep the electrodes on the center of the welding joint. This wheel is in advance of the leading electrode.

After each of the four external welds is completed, the heads are raised slightly and unfused flux is sucked out of the flux trough, which is then lifted enough to permit the fixture to be indexed and then is placed for the next weld. Although the welding rate is only 10½ inches per minute, it is fast, considering the large section of the bead, and the time per weld is less than for applying successive beads and cleaning after each one. Production of the weld under flux and at high current density insures the high quality required, and weldments serve their purpose well. Weld quality is checked by ultrasonic testing methods.



". . . I didn't know the gun was loaded."

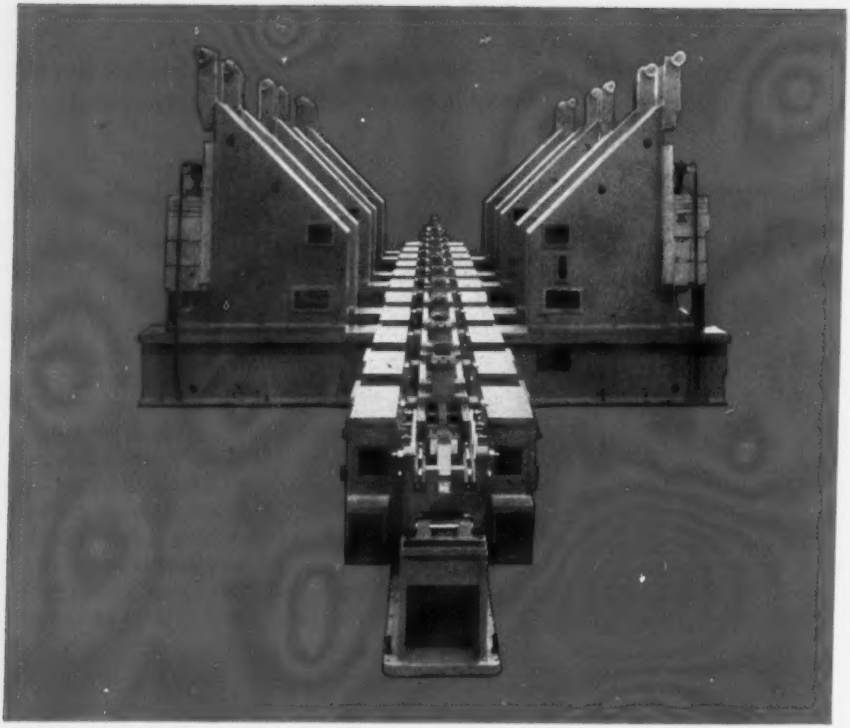


Fig. 1—Through maximum standardization in design, dimensions and tolerances, these standard Cross machine tool building blocks provide optimum interchangeability and flexibility.

Design Factors Affecting Machine Efficiency

Author explains what to look for when selecting machine tools for production line manufacturing.

By KURT O. TECH
Vice President Engineering, The Cross Company

In the preparation of a plan for an automatic machining operation, the amount of attention that is given to two specific areas plays an important part in determining the efficiency of the completed production facility. These two areas involve (1) processing the parts to be manufactured for optimum efficiency and economy,

consistent with production and quality requirements; and (2) the selection of machine tools and allied equipment to fully satisfy known requirements.

These two phases of pre-production planning can be a source of added profit or a source of dissipated profit—depending upon the "depth" of planning, analysis and forethought devoted to each area. In processing, this planning in depth is usually achieved.

In the selection of machine tools there are a number of considerations which contribute to efficiency, economy and trouble-free operation that are too frequently treated superficially or overlooked. Some of the more frequently overlooked factors include flexibility, accessibility, tool changing, electrical arrangement, work height and identification.

Flexibility

Flexibility is a term that has been used very "generally" as a feature of special machine tools. Actually, some degree of flexibility is provided in almost any machine design. However, to ensure optimum flexibility and its benefits, specific designs should be examined very carefully.

Flexibility, in its simplest form, is provided by maximum interchangeability of major and minor machine tool parts and components. Such interchangeability is facilitated by maximum standardization in design, dimensions and tolerances. There are three areas of standardization which lead to flexibility in machine tools and it is important that each be utilized fully to obtain the maximum in flexibility. They are: (1) industry standardization; (2) builders' standardization; and (3) custom standardization.

Industry standardization covers all standards which have been developed over a period of years by the machine tool and allied industries. Screws, electric motors, toolholders, machine tapers and chucks are typical of many of the items which have been standardized.

Not as well known, but of great importance in achieving flexibility in production machine tools, are machine tool builders' standards. These have been developed by in-

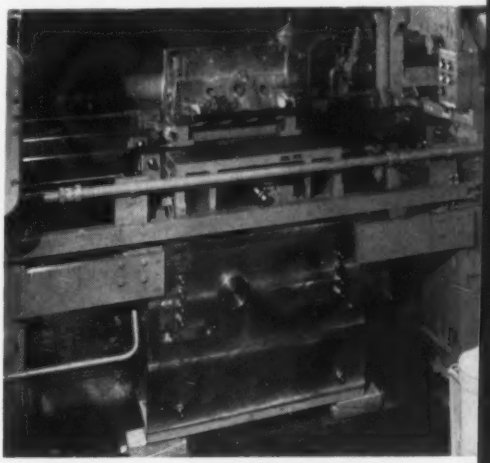


Fig. 2—All standard hole patterns and locating keys in this idle station of a Transfer-matic provide complete flexibility for quickly adding or shifting machine units as product design changes require with complete accuracy.

"Development of these standards has resulted in the concept of machine construction commonly called the 'building block' concept."

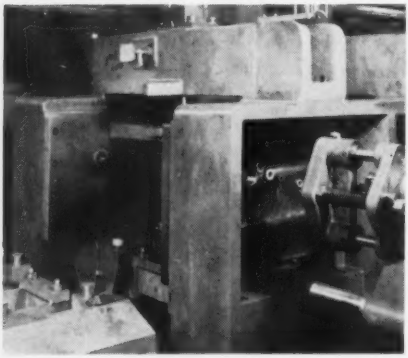


Fig. 3—Use of this standard bushing plate permits addition of holes, moving holes in any station or shifting complete stations in the machine with a minimum disassembly, minimum cost where parts must be scrapped and without any change to major components.

dividual machine tool builders for the purpose of providing greater interchangeability between components of machines. Components which have been standardized in this manner are standard way-type feed units, standard quill-type feed units, standard wing bases, standard columns, standard center base sections, standard transfer mechanisms and others.

Figure 1 shows a view of a partially completed transfer machine into which has been incorporated a high degree of standardization of these elements. Development of these standards by progressive machine tool builders has resulted in the concept of machine construction commonly called the "building block" concept.

Properly developed these standards should provide the following features: (1) identical hole patterns for mounting all units to the machine base including wing bases, brackets, columns or any special units which may be required; (2) keyed location of units to the machine, which permits shifting of units from station to station in a minimum amount of time and with complete accuracy; and (3) provision for complete utilization of all idle stations on the machine at a future date without any need for additional machining.

Figure 2 shows a portion of a transfer machine illustrating all of the above features. It is important that these standards provide true interchangeability. Many times building blocks are constructed to tolerances which do not permit interchangeability. It is rather common practice to manufacture building blocks to a standard and then re-machine them at assembly in order to make them fit the machine. This destroys much of their value as flexible components. When flexibility is your goal in machine tool planning, this interchangeability should be looked into in a very careful manner.

Standardization of custom components within a specific machine is usually even less well known and considered. It usually revolves around fixturing and other components which are directly related to the part being machined. Standardization of part locating pins in all fixtures throughout a transfer line would probably be the most

commonly known standard of this type. Yet, there are many lines in which this standardization is not achieved.

Common hole patterns for mounting all fixtures on one or more transfer lines offers another illustration of this type of standard. They make it possible to easily move fixtures from one section to the other.

Designs incorporating separate simple bushing plates with a standard interchangeable hole pattern mounted throughout the machine is another example of machine standards. Use of this standard bushing plate permits the addition of holes, the moving of holes in any station, or shifting complete stations in the machine with a minimum of machine disassembly, a minimum of cost where parts must be scrapped, and without any changes to major machine components. Use of these standardized bushing plates is shown in Figure 3.

A good illustration of the benefits derived from optimum flexibility

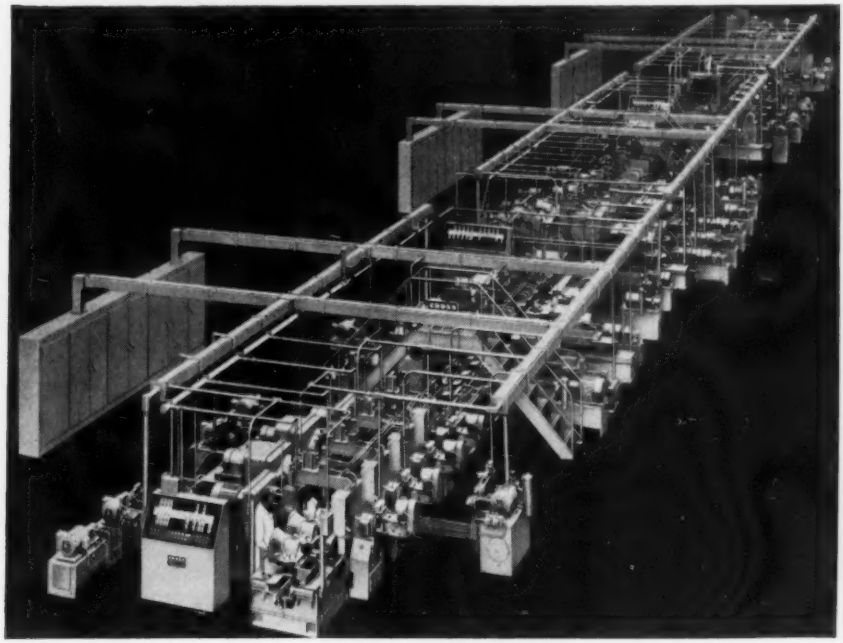


Fig. 4—This Transfer-matic for processing an automotive transmission case recently demonstrated tangible advantages of maximum machine flexibility to handle major part design changes.

"Accessibility and floor space are also factors requiring careful study in the selection of machine tools."

through standardization in machine design occurred on two recently installed transmission case lines. One line is illustrated in Fig. 4. The two lines were developed for production of four aluminum transmission cases. One line, designated as the Short Line, was designed to produce Case "A". A second line, called the Long Line, was designed to simultaneously process all four cases (A, B, C and D) without any changes in machine set-up. This versatility was achieved by means of sensing devices in the machine that direct the flow of the various cases through the line and, where required, actuate machine units as well as material handling devices.

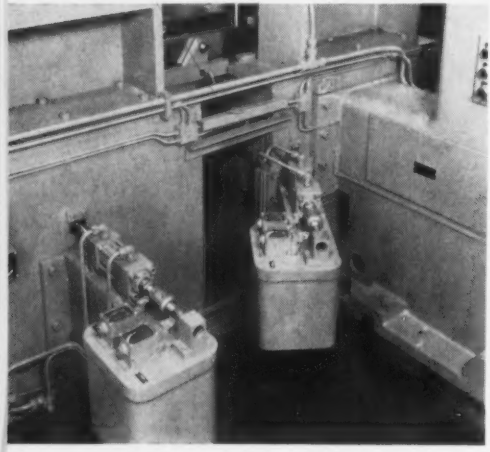


Fig. 5—Through careful planning of location and arrangement, these components are highly accessible and located completely outside the work area away from possible contamination by either metal chips or coolant.

Since these machines were installed, two major changes in production planning have taken place. Because of changing sales requirements, transmission Case "B" became the high production case. The Short Line, therefore, was converted from processing Case "A" to processing Case "B" at a cost of only 2.3 percent of the original capital equipment cost.

In addition, a new tranmission Case "E" has come into being and the Long Line was altered to handle this case—in addition to the four original cases—at a cost of only 2.8 percent of the original capital equipment cost. All of this was made possible without affecting the production rate of either line because the design incorporated the flexibility features just described. Most important were the custom standards developed for this line.

Accessibility

Accessibility and floor space are also factors requiring careful study in the selection of machine tools. While a machine must always be designed to perform the maximum amount of work in the minimum amount of floor space, decisions relating to "size" are rarely clear cut. Many factors must enter into such decisions.

In many cases, allotment of slight additional floor space will reap great rewards in machine efficiency by providing sufficient space for proper accessibility.

Since maintenance factors deter-

mine machine efficiency, every consideration must be given to minimize frequency of down time and, more important, minimize the amount of time it takes to put the machine back into operation once it is down. Accessibility is one of the most important provisions in machine design to effect shortest possible down time.

Machine layout must incorporate space between machine units sufficient for access to the center position of the machine for tool change and fixture maintenance. If station to station dimensions do not permit this type of accessibility, then idle stations should be provided between work stations.

Not in all cases is more floor space needed to attain the best accessibility. Careful design and planning of location and arrangement of many semi-durable machine components will do a great deal to provide adequate accessibility, as well as removing such machine components from areas in which they might be damaged.

Limit switches can be mounted so that they are easily accessible and away from contamination. Usually an air or mechanical linkage is necessary to operate the switch. A typical mounting of this type is shown in Fig. 5.

Hydraulic control valves can also be mounted away from the machine manifold or hydraulic tanks out of danger and easily accessible. A typical illustration of this type of mounting is illustrated in Fig. 6.

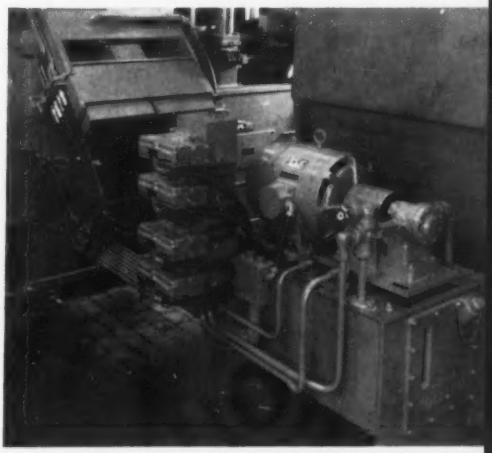


Fig. 6—Being located completely out of danger of contamination from either coolants or chips, unpredictable failures of hydraulic control valves are said to be minimized.

Cylinders can be removed from congested and dirty areas of the machine as illustrated in Fig. 5. Where they must be contained in the bed of a unit they can be so designed as to be removed without taking off any of the heavy components which they are actuating, as illustrated in Fig. 7.

Tool Changing

In view of the fact that tool changing is the one greatest cause for machine down time, every provision should be made to expedite changing. This can be achieved in the planning stages by adopting quick change, preset tooling wherever possible and in providing inspection and tool setting off the machine.

"The planning and design of the electrical control system is another key factor to be considered."



Fig. 7—Hydraulic cylinders that must be contained in the bed of a feed unit and which permit removal and replacement without major disassembly of the heavy components which they are designed to actuate, contribute to reduced accumulated down time.

"Ready" tooling may be stored close to the machines on which they are employed with Machine Control Units similar to the one shown in Fig. 8.

Tool change systems in transfer machines are not inherited with transfer machine installations; they must be planned. Where tool changes are programmed, all maintenance functions can be integrated effectively. Machine Control Units used in an "integrated" system incorporate a series of signal lights that inform all maintenance personnel, tool setters, operators, machine repairmen, and so on, of tool change periods. When the machine goes down, all maintenance possible is performed simultaneously. To facilitate teamwork, long transfer machines should incorporate a "communications network"—a telephone system with phone jacks strategically located throughout the line.

Electrical Arrangement

The planning and design of the electrical control system, together with the control console, is another key factor to be considered. The basic design of most control systems for operating machines automatically are quite similar. However, the system must satisfy certain "maintenance" requirements. In a machine as complex as today's modern transfer installation, failures will sometimes occur and it is essential that such failures be located quickly and corrected.

A well planned and designed push-button console, similar to that shown in Fig. 9, is of great importance in trouble-shooting a transfer-type machine. In fact, the design of the control console and the control equipment arrangement will play a large part in determining how much down time will be required in electrical trouble-shooting.

The console provides the first clue to the cause of machine breakdown and should pinpoint the location of trouble. The simplest console design simulates a plan view of the machine

itself with the signal lamps required arranged on this outline in the same relative positions as the devices they represent.

Proper control panel arrangement is also necessary to reduce the time required in trouble-shooting. Building block arrangement in control panels pays great dividends. First, it provides the same flexibility for rearrangement of machines as was pointed up earlier on mechanical components. In addition, it results in a control cabinet consisting of multiples of one or more simple circuits, rather than a cabinet containing one large complex circuit.

By breaking down circuits into their simplest elements and arranging these elements identically in the panels it is a good deal easier to train electrical maintenance people on new and unfamiliar machines. Figure 10 illustrates a typical cabinet arrangement of circuit elements of the type employed in Cypak control panels. Similar arrangements are made with relay operated control panels.

Work Height

Work height and structural rigidity are also important factors to be considered in machine planning and design. These factors must not be compromised for such considerations as operator loading heights or existing conveyor heights. Many times, such restrictions have been found to seriously affect machine rigidity and the proper machine proportions with the base elements.

Space must be provided through the machine for chip conveyors, automatic lubrication systems, coolant systems, hydraulic systems and air lines without sacrificing any needed rigidity.

Identification

A very important factor which should be considered in all machine tools which are as complex as today's modern production equipment is proper identification of components. Almost any type of maintenance requires that a maintenance man identify either the component upon which he is working or the proper function of that component in the machine tool. This information does no good on drawings in the files of the Manufacturing Depart-

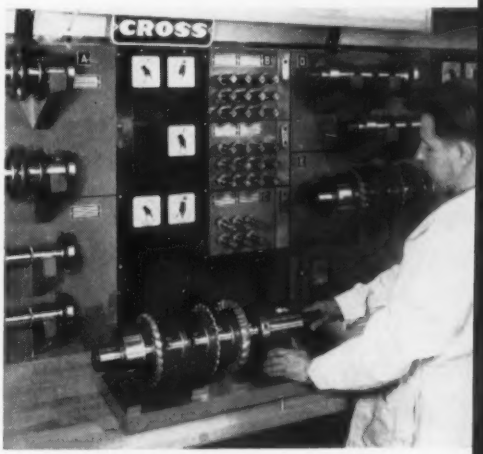


Fig. 8—Tool change systems must be planned for transfer machines to reduce down time.

"Successful machine designs are achieved only through careful attention to the details described . . ."

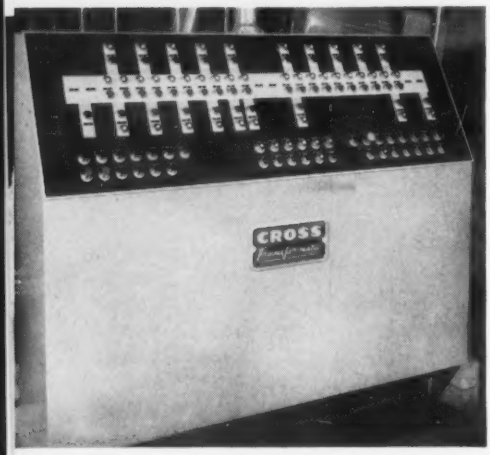


Fig. 9—A well planned push-button console such as the control center shown in this illustration is of great importance in trouble-shooting a transfer-type machine.

ment or the Plant Engineering Department. It must be available on the machine at the component on which the trouble occurs.

This can be achieved only by proper tagging on the machine, not on the component. Valves, limit switches and cylinders must be tagged for function, for identification in the hydraulic or electrical circuit, and for purchase specification. Relays, timers, starters, wires and hydraulic lines must be identified so that they can be used to trace circuits. Figure 11 shows a method of tagging hydraulic valves. Figure 12 illustrates the tagging of limit switches.

The location of unit circuits must be tagged outside of control cabinets as shown in Figure 10, so that it is not necessary to open the door to find where the specific equipment to be checked is located.

Lubrication instructions must be clearly specified directly on the machine and where possible such information should effectively coordinate the eventual users requirements, as well as the machine tool builder's specifications.

Successful machine designs are achieved only through careful attention to the details described above, as well as many others. This holds true on both simpler machines and large complex machines. It is important in planning for new production

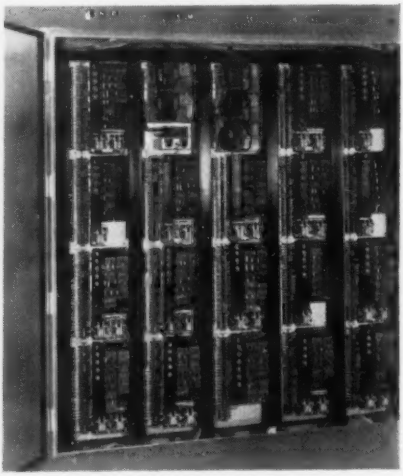


Fig. 10—"Building block" design and arrangement of control panels has been found to greatly simplify electrical trouble-shooting.



Fig. 11—Important savings in machine down time are realized through clear identification of hydraulic valves.

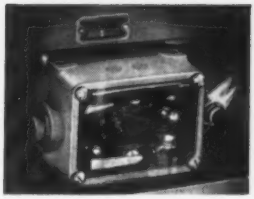


Fig. 12—Proper method of tagging limit switches.

facilities that we analyze in depth to be sure that we will have equipment in which the details have been considered very carefully — to be positive that these Tremendous Trifles that are so important to machine efficiency will be working fully for us and not against us.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Space Guide. Edited and published by Vincent F. Callahan, Publisher, Evans Bldg., Washington 5, D. C. 150 pages. Price, $10.00.

A non-technical sourcebook for businessmen, "Space Guide" is believed to be the first book dealing exclusively with research, development, production and procurement activities of the new National Aeronautics and Space Administration (NASA). Purpose of the book is to provide manufacturing firms, research organizations and educational institutions with authoritative information on NASA, with emphasis on NASA's contracting activities. It tells manufacturing executives interested in space contracts where to go, who to see, what NASA is buying, plus other facts.

A partial list of contents of "Space Guide" is as follows: Organization and Functions of NASA, Including Official Organization Chart; Biographies of Key NASA Officials; Procurement — Plans and Policies of NASA; NASA Field Stations, Review of Procurement and Research Activities at Field Offices: Langley Research Center, Virginia; Lewis Research Center, Ohio; Ames Research Center, California; High Speed Flight Station, California; Pilotless Aircraft Research Station, Virginia; Jet Propulsion Laboratory, California; Plum Brook Research Reactor Facilities, Ohio; and Research Center, Beltsville, Md.; List of Proposed Projects of NASA; Official Copy of Space Act of 1958; Brief Descriptions of Highlights of Space Act of 1958; House Committee on Aeronautics and Space Exploration — Members of, Staff, Functions; Senate Committee on Aeronautical and Space Sciences—Members of, Staff, Functions; Basic Description of Mechanics of Space Flight; Glossary of Aero-Space Terms; Products Purchased by NASA; Forms Used in NASA Procurement; Patents; Review of NASA Activities Since Its Formation in Late September 1958 and Forecast of Things to Come; Introduction to Outer Space—Prepared by President's Science Advisory Committee.

Distributor Service Is Key Production Aid



The industrial distributor is as near as the phone, ready to assist with merchandise or advice. It will pay you to know him better.

By LYMAN H. BELLOWS
Vice President-Sales, Sheldon Machine Co., Inc., and President, American Supply and Machinery Manufacturers' Association, Inc.

The 400 members of the American Supply and Machinery Manufacturers' Association are manufacturers of industrial supplies and machinery which include such items as abrasives, belts, nuts, bolts and screws, saws, chucks, portable tools, machinery, cutting tools, transmission material, and so on. A large percentage of these products is sold to industry by the industrial distributor.

It is reported that the overall sales of industrial distributors total approximately four billion dollars per year. This figure indicates the importance of the industrial distributor to industry.

The average distributor carries in stock these products of the industrial supply manufacturer. Distributors' salesmen call on industry and promote and sell these products. Sufficient stock is carried by distributors to meet the anticipated needs of their customers. With new products and changes in design, you can readily understand the stock problem of the distributor. In addition to stocking and selling a multitude of industrial supplies and machinery, a distributor also handles the other functions incident to sales, such as the invoicing and collection of the account.

Some industrial distributors have set up specific departments within their organizations to handle specialized lines, such as cutting tools, fasteners, power transmission equipment, and so on, so as to better serve the customer. We should also point out that some distributors of other items, such as hardware, steel, machine tools, and so on, have set up departments within their operations which handle industrial supplies.

Industrial supply distributors have two organizations to assist them in more profitable operation: the National Industrial Distributors' Association (NIDA), comprised of about five hundred members, who are located in the Northern and

Western part of the United States, and the Southern Industrial Distributors' Association (SIDA) whose members are located in the Southern states. In addition to these two national associations, there are local groups in various areas of the country.

The readers of this magazine will be interested in knowing the answer to "Why — the Industrial Distributor?"

(1) Advantages to them if they buy supplies for their own use from the distributors.

(2) Advantages to them if their product can be sold through the industrial distributor.

(1) As a consumer or user of industrial supplies, the greatest value to you of an industrial distributor is the delivery that he can make at once from his stock. In almost every city of any size, there is a distributor, distributor branch, or an industrial distributor regularly serving that city. This usually means that delivery of telephone orders can be made, generally, the same day. It would probably be impossible for consumers of industrial supplies to operate very long without the distributor unless they carried a much larger inventory at a considerable cost to them.

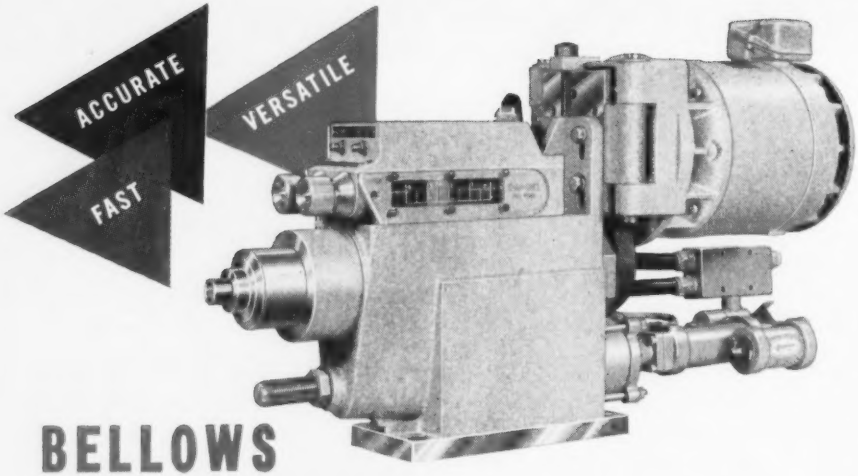
Consider the number of small miscellaneous items that are purchased each day from the industrial distributor. Imagine writing separate orders for each of these: two V belts, one box of $\frac{5}{8}$-inch cap screws, three grinding wheels, two gears, ten twist drills, and ten hacksaw blades. In addition to this, the distributor carries in stock many special items to be able to take care of specific consumer requirements. Regular stocking of special items is expensive for a distributor, but in many cases, because of his total volume of business with a particular company, it is practical.

Many distributors have men who are fully informed on particular

The Author



LYMAN H. BELLOWS, Vice-President, Sales, Sheldon Machine Company, Inc. was born in Providence, Rhode Island. He obtained his formal education in Boston and later in Worcester where he became employed by Walden Worcester, Inc., wrench manufacturer. After working into accounting and sales, he became sales manager for Bonney wrenches. His next position was that of sales manager for Van Dorn Electric Tool, after which he went to the Stanley Works. At present he is directly in charge of the sales and advertising departments at Sheldon Machine Company. In several official capacities, including that of present President, Mr. Bellows has contributed immeasurably to the stature and progress of the American Supply and Machinery Manufacturers' Association.



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Donald Boyd, methods engineer, shows parted stock and the formed part, handle for material handling equipment.

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". . . distributor associations have done a very excellent job in a great many fields . . ."

products so that they can act as sales engineers for these more complicated products. Having a technically trained man available locally to solve difficult problems is extremely valuable to the industrial consumer, and this service is performed by distributors.

The distributor buyer has an opportunity to carefully screen the products that are offered to him. He evaluates the quality of the product and determines whether it is suited for the customers he serves. This analysis of new products is a continuing function of the distributor buyer so that he can have available for the distributor the latest products obtainable which will perform satisfactorily for his customers.

It has often been said that distributors stay in business by the proper choice of the right products for their consumers.

(2) Many of the advertisers and readers of this magazine will find industrial distributors the proper solution for selling their products. Your industrial distributors should be thought of as your partners. They play an important part in the sale of your product. Their salesmen are actually your salesmen. Your own salesmen or manufacturers' agents calling on the distributors perform the function of sales managers for you in their contacts with the distributors' sales personnel. Since the distributor's salesman is handling a number of lines during his sales contacts, the cooperation and assistance you give him will be reflected in his presentation of your product to the ultimate consumer.

As a member of ASMMA for many years, I have found attendance at joint meetings with the distributors to be very helpful since it has given me an opportunity to discuss mutual problems with other manufacturers, as well as with the distributors. The programs of these meetings, over a period of years, indicate that the manufacturer and the distributor are a team, with both members cooperating to do the most effective job for the customer.

During past years, the distributor associations have done a very excellent job in a great many fields which have been of assistance to their members and to the manufacturers with whom they work. If your company does now or plans to distribute its products through industrial distributors, I urge you to familiarize yourself with many of the programs conducted by the distributor associations since they will be of great help to you in your relations with the other half of your sales team—your distributor. In order to make your program with your distributor more effective, you will find it very helpful to review and, perhaps, change some of your procedures in regard to catalog preparation, advertising, sales training, and other programs. The proper presentation of information regarding your product by the distributor salesman will, in a large degree, be determined by the procedures you follow in presenting this information. Effective use of

industrial distributors will depend upon your ability to keep your distributors informed as to your products.

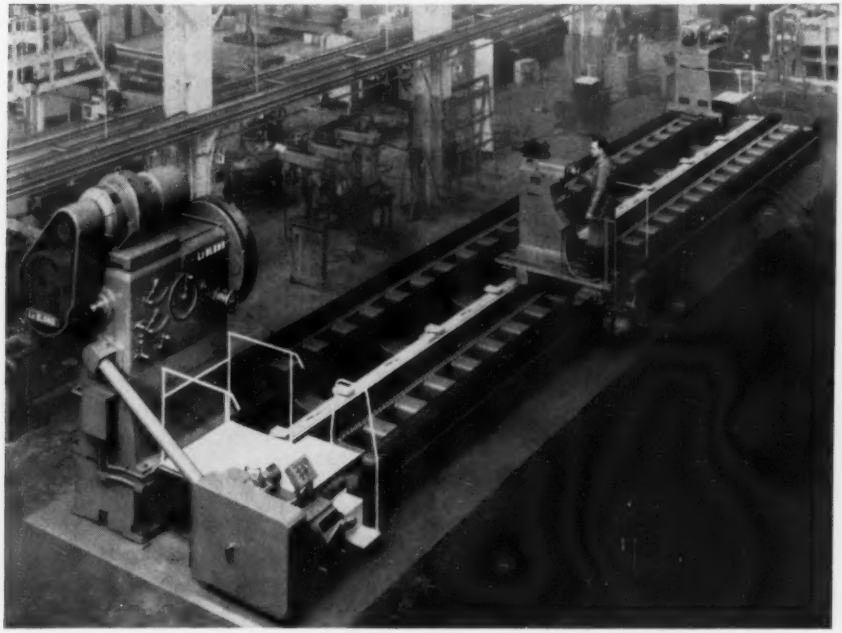
It should be pointed out that the degree of success which is achieved by the industrial distributor is dependent upon the manufacturer and distributor working as a team to bring the manufactured products they handle to the ultimate consumer. It is my pleasure to report that there is splendid cooperation between manufacturers and distributors, and everything indicates that this effective partnership will continue for many more years.

I hope that, in this brief article, I have been able to give you some ideas concerning the excellent work which is done by industrial distributors. Perhaps, all I have said is summed up best by quoting the wording on the familiar I. D. Seal, "Industrial Distributors—The Right Hand of Production—Serving Industry Economically."

★ modern machine shop ★

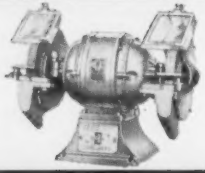
First Double-Bed Rocket Lathe Weighs 75 Tons

A space age lathe so large that only three railroad cars in the country can handle it has been shipped from R. K. LeBlond Machine Tool Co., Cincinnati, to Aerojet-General, Inc., at Azusa, Califor-

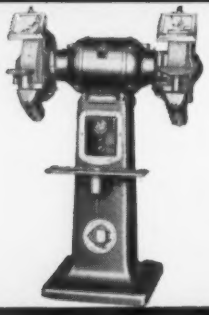


Double-track ways clear the "main line" for a workpiece of unusual length (45 feet) and diameter (105 inches). Two or more carriages can be operated on the forward ways.

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nia. Where ordinary lathes have one bed, this giant has two side by side. Said to be the first double-bed lathe to be built in this country, it weighs in excess of 75 tons, and is 54 feet 6 inches long and 120 inches wide. A 47-inch faceplate was furnished, however, the double bed gives the lathe a clear swing of 105 inches over the platen.

Known as the "Admiral," this machine can be used for metal turning but also has other applications, presumably in the manufacture of rockets, since its purchaser is prominent in this field. The Admiral can handle a workpiece 45 feet long and 105 inches in diameter. Its spindle bearings will take a 50,000-pound line load.

Equipped with only a 50 horsepower variable speed motor, the Admiral has a full range of speeds from 1 to 110 revolutions per minute, and feeds as low as 0.01 inch per revolution. The spindle is equipped with an electric brake for quick stops. Leads can be varied in microscopic steps.

The operator of the Admiral is dwarfed by the size of the machine. To minimize fatigue, most of his controls have been concentrated on the front of the lathe carriage, including remote controls for the headstock. He rides along on the lathe carriage, which runs on the outer set of ways. There is ample room on the outer bed of the lathe for the addition of a second carriage, should such a carriage be required.

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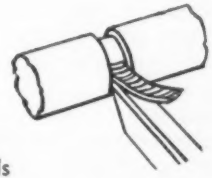


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The Distributors' "Self Improvement" Program

The author outlines the four steps of a large scale program aimed at maintaining distributor function with a diminution of expense.

By JOHN N. FAILING
Vice President and Sales Manager, Charles A. Strelinger Company and President, National Industrial Distributors' Association

During the past year industrial distributors have found themselves in the unfortunate predicament of having to face the rising cost of doing business on the one hand, and, the urgent need to maintain or improve service to their customers on the other. While it is mandatory to cut costs, such measures must be undertaken with extreme caution lest the basic reasons for the existence of a distributor be endangered.

Industry manufacturers who have been faced with the pressure to economize have installed faster, more efficient production equipment and machinery, but the distributor lacks the same recourse since his costs include many services that do not come under the direct heading of distribution.

Recognizing the problem confronting a majority of their membership the National and the Southern Industrial Distributors' Associations have undertaken a large scale "Self Improvement" program aimed at maintaining distributor function with a diminution of expense. The program is outlined below in four steps:

1. Upgrading management techniques through education courses.
2. Product line profitability analysis.
3. Adoption of standard accounting procedures among members as a means of comparing specific cost.
4. Research of distributors services to uncover facts which will prove the industrial distributor provides the most economical channel to move most supplies and equipment from producer to the ultimate user.

The educational program for management is under the direction of the Joint Educational Aids Committee of the two associations. For the third time the committee will sponsor in 1960 a three weeks' course at the Harvard Graduate School of Business Administration.

Open only to top management of members of the National and Southern Associations, the course was organized around the case history system which the Harvard Graduate School has pioneered in the field of business education. It stretches the executive minds, shows them how to make a broad objective approach to their problems and how to avoid rejecting possible solutions because they are unique and new. Another part of the committee's activity has been the encouragement of regular four-year college courses leading to degrees in industrial distribution. Four colleges in separate sections of the country are now offering such courses: Clarkson College of Technology, Potsdam, New York; Bradley University, Peoria, Illinois; Texas A & M, College Station, Texas; and Western Michigan University, Kalamazoo, Michigan.

The second major area of industrial distributions' "Self Improvement" has been the promotion of an accounting procedure which enables members to apportion their operating costs accurately among the various lines they handle. The distributors can thereby determine which lines produce the greatest net profit, and which ones require management attention to reduce cost. The factual data obtained will also enable the individual members to advise their suppliers of unsatisfactory situations on lines that are not profitable, and to concentrate sales efforts on the lines that are profitable. Present indications are that about 100 members of the two associations are now analyzing, or planning to analyze, product lines for profitability. Our association has circulated information on one method of analyses developed by a prominent supplier, and will shortly distribute an alternate method being used by one of its members.

The third approach to "Self Improvement" has been through our Modern Methods Committee which has devised a Standard Chart of

The Author



JOHN N. FAILING, currently President of the National Industrial Distributors' Association, was born January 9, 1904, in Bloomfield, N. J. He attended public school in East Orange, N. J., Phillips Andover Academy and Yale University, graduating with a Ph.B. degree in 1927. Mr. Failing served in the Army Air Force from 1942-1946, attaining the rank of Major. He is Vice President and Sales Manager of the Charles A. Strelinger Company of Detroit, distributor of machine tools and industrial supplies. He is a member of the A.S.T.E., Engineering Society of Detroit, Economics Club, Country Club of Detroit, Aero Club and the Detroit Athletic Club, and is very much interested in many civic affairs.

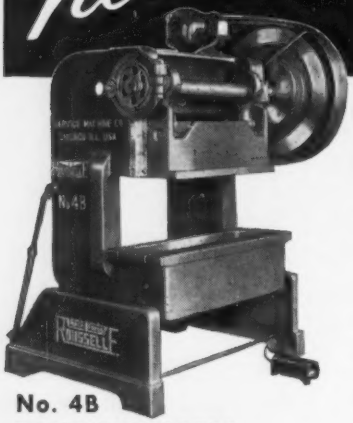
The Distributors' "Self Improvement" Program . . .

Accounts which was released to members for use in conjunction with the 1957 Overhead Expense Report. In addition to its being highly practical for accounting purposes, adoption of the chart enables members to establish better internal expense controls, and leads to greater efficiency in the operation of their business. It is also used for Budgeting, and provides data for profitability of line studies. The 1958 Overhead Expense Report is now being prepared. This report will contain averages for each expense item. The information contained therein will also be broken down into geographical trading areas.

As a further means of promoting the use of the Overhead Expense Report, the committee has engaged the George D. Wilkinson Organization of Management Consultants to conduct a series of regional meetings on its advantages.

While the preceding methods are aimed at tightening up distributors' internal operations, the fourth approach is one of primary interest to suppliers and consumers of industrial supplies and equipment. A research group at Ohio State University, headed by Dr. Theodore Beckman, well-known authority in the field of marketing, has been

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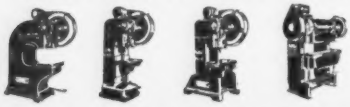


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engaged to undertake a study to compile specific information on the essential service provided by distributors. The program is expected to cover five major areas and will require several years to complete.

The first area will encompass the measurement of Value Added by Distribution. This will demonstrate our industries' net contribution to the economy, and place the distributors' services in the proper perspective. Among other subjects to be covered will be (1) savings to industry by purchasing from the distributor, (2) savings to manufacturers by channeling their products through distributors, and (3) measurement of distributors productivity and efficiency. The first area study will be forthcoming from Ohio State in the next few months and it is eagerly awaited by our industry. Plans are underway to disseminate the results to suppliers and customers so as to give them a new insight into industrial distribution functions.

We believe that the preceding explanations of the Distributors' "Self Improvement" Program amply demonstrates that our industry is using strongly cooperative efforts to meet its problems in a constructive manner. In the end, the industrial distributors' effort will be more efficient and, therefore, considerably more profitable to both the manufacturer and the consumer of industrial supplies and equipment.

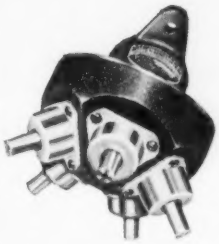
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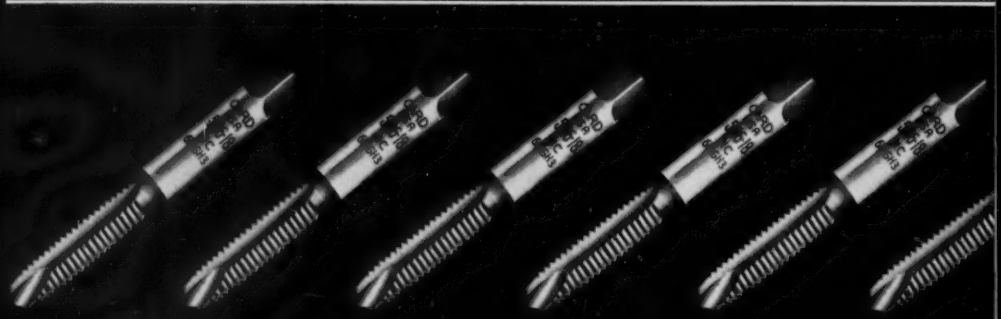
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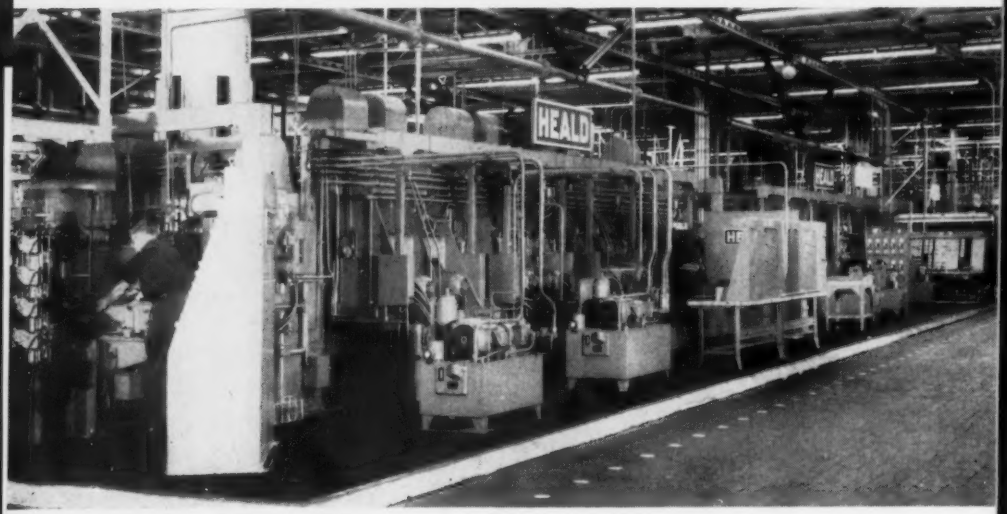
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more production through modernization

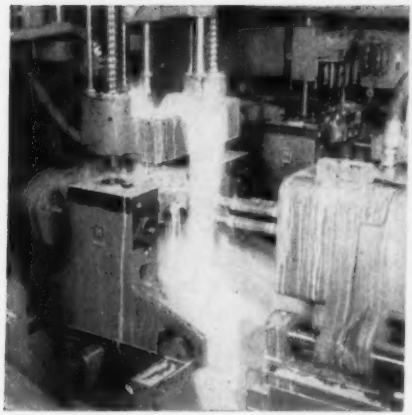
Techniques for increasing output with newly developed machines and tools.

In-Line Automation of Transmission Nerve Center Provides Flexibility

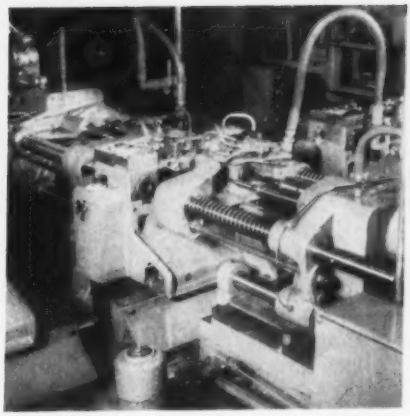
In-line automation of lower valve bodies—nerve centers of the modern automatic transmission—has been accomplished for the first time at Ford Motor Company's new Transmission and Chassis Division plant in Sharonville, Ohio. Here 287 different parts for Ford's all-new two-speed transmission for 1959 models are produced and assembled with the greatest proportion of automated equipment ever brought together for this manufacturing operation — 942 machines, 145 additional items of major equipment and 7 miles of overhead conveyors. Previously, lower valve body



In-line automation of lower valve bodies is achieved on this Heald palletized transfer line at Ford's new Sharonville, Ohio, plant. View shows one of the two lines now operating.



Tapping and drilling operation performed at station 12, section 1 (ghostly effect of coolant is the result of time exposure).



Core drilling spool bores prior to reaming at station 4, section 2. After drilling, bores are semi-finished and finish reamed.

jobs were handled on rotary indexing machines where eight separate in-process hand loading operations were required because only a limited number of machining operations could be performed. The in-line Heald Bore-Matic system, in which all operations are palletized for the first time on a lower valve body job, handles 171 operations (112 machining, 52 probing and 7 air gaging) on 48 separate holes and bores and 5 side faces of the die cast aluminum part. All operations are performed on pallets because locating surfaces on the aluminum material could be distorted by repetitive clamping.

Parts come to the transfer machines after two qualifying operations. The large mounting face of the aluminum die casting is machined on a Heald continuous precision facing machine. Parts then move in pockets on an overhead chain drive conveyor to a rotary index machine for drilling two deep holes, and drilling and reaming two locating holes plus four miscellaneous holes in the back side of each of the parts. The two qualifying machines feed both transfer lines, with the overhead conveyor providing sufficient storage room between operations.

Loading of the 94 working pallets per transfer line is semi-automatic. A fork places the part face up on two dowel pins, and a power nut runner clamps the part to the pallet. The operator need never put his hands inside the pallet while clamping the part. At each loading station air is blasted through locator holes and an automatic greaser fully lubricates the linkages located within each pallet.

Pallets move through the transfer line on rollers and are lifted off the rollers at each machining station by four hydraulically-operated clamp rods. Two of the rods terminate in dowel pins which locate in and pick up bushings in diagonal corners of

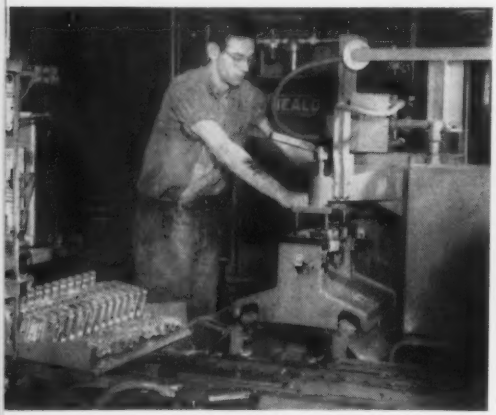
the pallet bottom. Dowel pins and bushing faces are blown off with air immediately before clamping. During transfer, pallets are held firmly captive between two lugs provided on the transfer bar. In the idle stations the pallets are restrained by means of slide pads located between the rollers.

Only one station is idle in the 19-station first section, where the following operations are performed: 46 drilling, 9 chamfering, 9 counterboring, 18 tapping, 2 reaming, 5 facing and 52 probing. Machining takes up about two-thirds of the 18-second cycle time per station, with transfer, pallet clamping and rapid traverse accounting for the balance of the cycle.

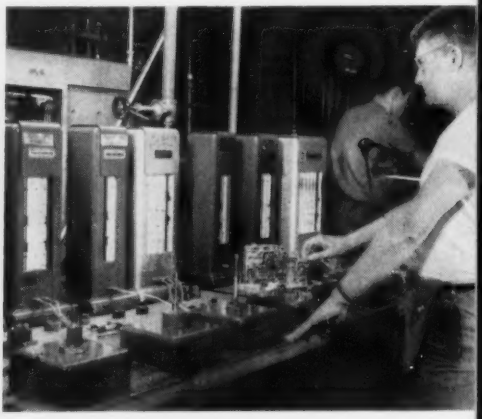
Pallets and loading mechanism of the second section are identical to those of the first, and the two pallet lines can be made continuous in the future if desired. Cycle time is also identical. Operations performed in the second section are: 4 core drilling, 7 semi-finish reaming, 7 finish reaming, 5 facing and 7 air gaging. Spool bores are first core drilled, then semi-finish and finish reamed and finish faced. Bores are air gaged for diameter only, with any off-size condition indicated by means of lights so that the operator can shut down the machine at his option.

The five side surfaces are semi-finish faced at the beginning of the first machine section and finish faced at the end of the second section. Facing heads employ a downward cutting stroke and are retracted by an air operating mechanism in an upward stroke and then pushed out to correct depth.

Immediately preceeding each unloading station, parts and pallets are flushed with coolant and blown off with air. At the unloading station, a manually-operated stripper

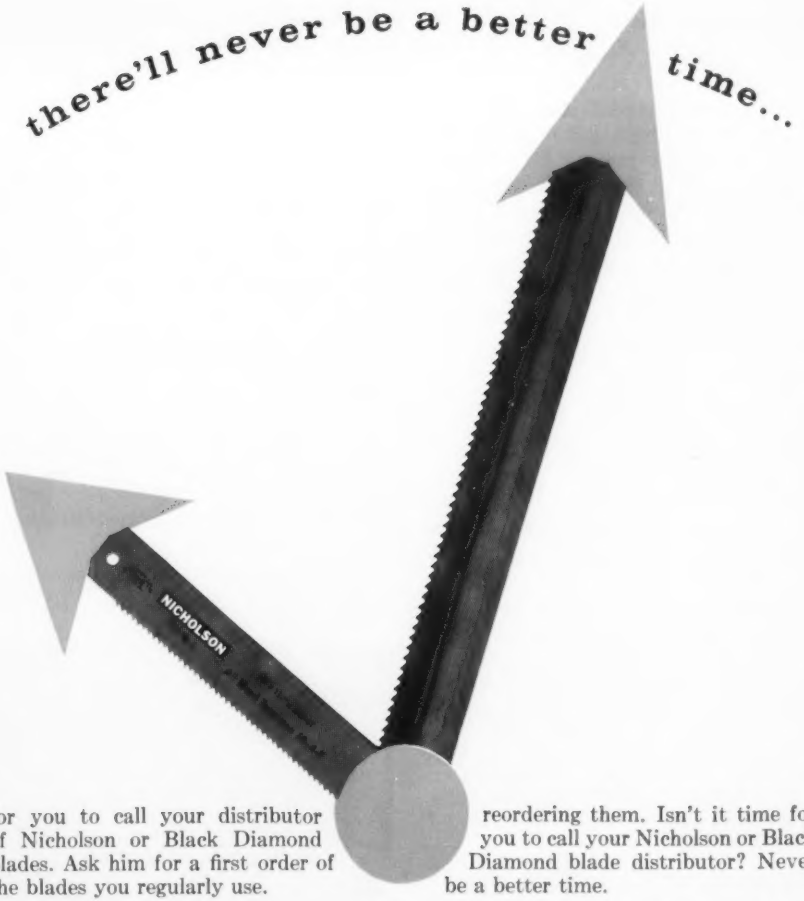


At unloading station, manually-operated stripper disengages parts from locating dowels to keep worker's hand out of pallet.



Inspection follows unloading of parts. Holes and bores are numbered regardless of operation performed to simplify identification.

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pushes the part off the locating dowels, again keeping the operator's hand out of the pallet. Pallets run through a hot detergent washing station on the return conveyor line. An overhead trolley wire over the full length of the transfer line allows for stopping operations from any point. Vertical air slides are mechanically counterweighted for safety.

Parts are inspected at a battery of precision air gages before moving to assembly on an overhead conveyor. Because of the complexity of the lower valve body, Ford numbers all holes and bores regardless of the operation to be performed to facilitate identification.

Valve bores are held to plus-minus 0.0005-inch size tolerance and 50 microinch finish. Facing of the five side surfaces is flat within 0.0003-inch T.I.R., and 32 microinch finish is achieved.

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Electrolytic Grinding Reduces Milling Cutter Production Costs

Application of electrolytic grinding to the production of carbide-tipped milling cutter blades has opened new areas of opportunity for improved product quality with minimum machining costs at the Ingersoll Milling Machine Company, Rockford, Illinois. Work handled on the Mattison No. 24-A electrolytic grinder includes milling cutter blades ranging from $\frac{5}{8}$ by $\frac{3}{4}$ inch to $1\frac{1}{4}$ by $2\frac{5}{8}$ inches. The grinding operations involve removal of 0.005 to 0.008 inch of carbide and 0.002 to 0.004 inch of steel on an average pass. As much as 0.012 inch of carbide may be removed when the shank area is small.

Formerly, milling cutter blades were ground using silicon carbide green grit wheels on horizontal spindle surface grinders. Unit pressures had to be so high in order to penetrate the carbide that the wheel had a tendency to gouge into the softer shank steel. The new machine —equipped with a 1500-ampere Anocut unit, the largest ever built —replaces two of these horizontal surface grinders.

With the new setup, machining costs have been reduced by 18 per-



Operator loads milling cutter blade onto segmented magnetic table. Work is loaded onto the magnetized section, with the table revolving at 12 to 15 revolutions per hour.

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. . . states Mr. Creighton Blanchard, toolroom superintendent at New Hampshire Ball Bearings, Inc., Peterborough, New Hampshire

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"We have three grinders in our toolroom—a Thompson and two competing machines. In our general toolroom grinding, especially on carbide and hard metals, we find the Thompson Type D so superior that we have recently purchased another Thompson just like it. All our precision work goes on the Thompson."

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- Steel roller anti-friction slides eliminate ball creep and increase rigidity.
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- No backlash, anti-friction ball nuts and screws on cross feed prevent wheel from creeping away from work in shoulder grinding.
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- Immediate delivery available.

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cent, abrasive costs by 80 percent, and significant savings have been effected in reduced scrap. The wheel used is a 16 inch diameter by 4 inch face "cup-type" with 1/16 inch depth of diamond. This type of wheel is applicable as a result of the lower grinding temperature and pressure experienced in electrolytic grinding.

Milling cutter blades produced by Ingersoll are subjected to 100 percent Zyglo inspection to insure uniformity of product quality. Surface finish attained during the electrolytic grinding process is 20 microinches r.m.s. maximum, the same surface finish as that obtained with the methods that were previously used.

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Carriage-Mounted Drill Press Shortens Cylinder Drilling Time

A specially mounted and adapted Walker-Turner 20-inch drill press has eliminated the need for moving a large printing press "transfer" cylinder to a radial drill and has shortened drilling time by one-third at the Cleveland plant of the Harris-Seybold Company, a division of the Harris-Intertype Corporation.

The drill press, mounted over the cylinder, is used to drill and tap vertical holes in the same setup in which horizontal holes are bored by two horizontally mounted drill heads at either end. Previously, the cylinder was carried by crane to a radial drilling machine where the vertical holes were drilled and tapped in a separate operation. In



View of inspection setup at Ingersoll where all finished milling cutter blades are subjected to 100 percent Zyglo inspection. Electrolytic grinding reduces rejects to an absolute minimum.

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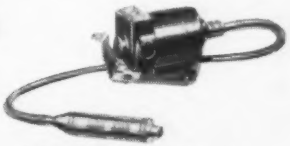
For tool and die work accuracy or rugged production use. Rigid, precision 3-bearing construction. 1/10 hp. Quick change ⅛" or ¼" cap. chucks. Takes ⅛" to ⅜" diamond mounted wheels or burrs. 22,000 rpm. Weighs under 3 lbs. Only $49.50, FOB Racine.

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addition to eliminating extra handling and speeding drilling, the new setup frees the radial drill for the large-capacity work for which it was designed.

The standard 20-inch Walker-Turner drill press is mounted and adapted as follows:

1. An elevating slide, on which the drill press is positioned, is mounted on a carriage that rides tracks along either side of the platform. This setup permits positioning at any point. (Carriage supports, incidentally, are standard Walker-Turner floor model drill press columns.)

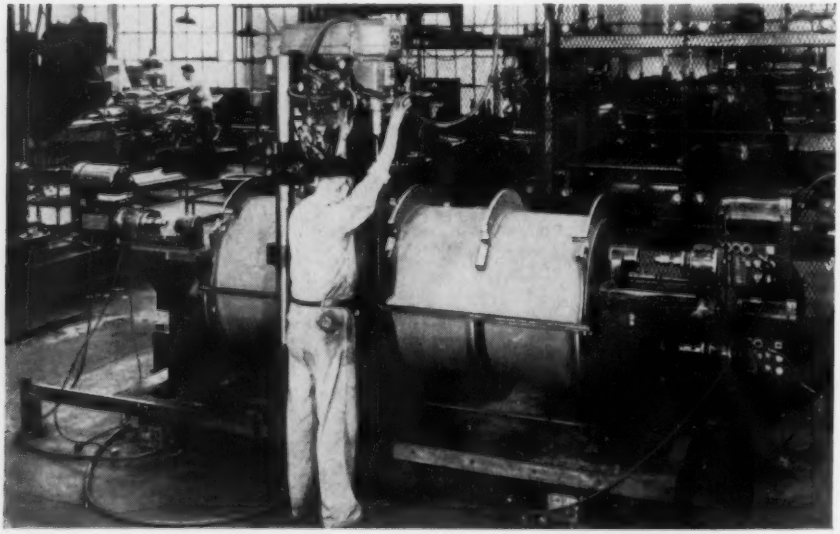
2. A reversing duty electric motor, controlled by a three-position switch (drill-tap-off) and limit switches actuated by spindle movement during tapping, permits both drilling and tapping.

3. Pneumatic feed reduces the operator's work. The pneumatic system incorporates two solenoid-controlled pressure regulators—one at 22 p.s.i. for drilling and one at 10 p.s.i. for tapping—and a by-pass valve that permits manual lowering of the machine spindle for the purpose of positioning.

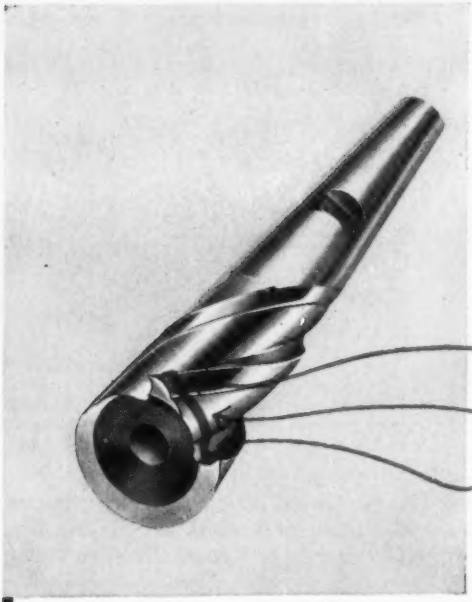
4. A quick-change chuck permits quick shifting from drilling to tapping without repositioning.

Holes are drilled and tapped through jigs—four holes with each of three jigs. Extension drills and taps are used to reach the sides of the large cylinder.

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Carriage-mounted drill press setup used to drill and tap vertical holes in printing press "transfer" cylinder in which horizontal holes are bored by two drill heads at either end.



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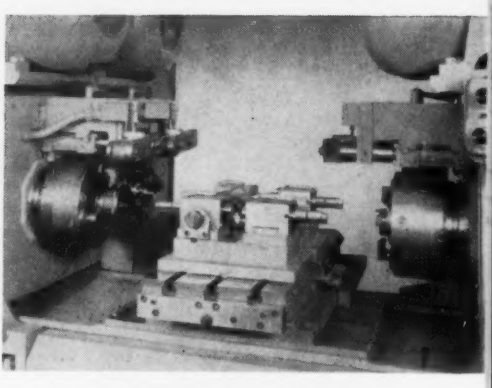
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END MILL DIVISION **DETROIT 20, MICH.**

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More Production . . .

Unique Locating and Clamping Arrangement Solves Boring Problem

An interesting locating and clamping problem has been solved by Ex-Cell-O Corporation, Detroit, on one of its precision boring machines. The component was an automobile universal joint ball and bushing assembly. The operation was to finish bore the bushing diameter and finish face and counterbore the body. It was required to locate from the inner spherical area and clamp on the outer spherical area of the part. Radial location was from an internal slot within the part.



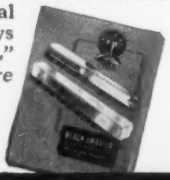
Close-up of Ex-Cell-O precision boring machine showing special air-operated chucks and above these the ram for fixturing parts.

A special air-operated chuck was designed and used in conjunction with a ram to fixture the part. After

DRILL HARDENED STEELS WITHOUT ANNEALING —



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon - high chrome steels of any degree of hardness. "HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly. *Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" Drills are cutting costs in thousands of plants.*



BLACK DRILL COMPANY, INC.
1372 East 222nd Street • Cleveland 17, Ohio

YOU HARDEN IT —
WE'LL DRILL IT WITH — **"HARDSTEEL"**

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LOOK *for improvements in industrial handcleaners*



A NEW WAY to clean working hands

There has never been such a combination of *plus* features to keep workers' hands healthy—and therefore on the job day after day!

It's a brand new scientific formulation — non-depleting Lan-O-Kleen *PLUS*.

It's WEST'S famous Lan-O-Kleen handcleaner *plus* a softer scrubbing action *plus* a gentler sudsing action *plus* a soothing lanolin action!

All of which combine to combat the depletion of natural skin oils while hands are being washed clean.

Highly important is the exclusive process that keeps the rich lanolin content of Lan-O-Kleen *PLUS* "free" to soothe and soften. Lanolin is impregnated into a corn meal base, instead of being "held" in the soap by conventional methods. In this way, it is instantly released for more positive, beneficial action.

Lan-O-Kleen *PLUS* is dispensed from a patented, precision-action unit A clog-proof measuring valve with a mechanical agitator delivers a thrifty, yet adequate individual portion. More than 435 pairs of hands can be washed with each dispenser filling.

FREE TRIAL OFFER. We'd be glad to send five pounds of Lan-O-Kleen *PLUS* and loan a dispenser for free trial. Or we'll send a smaller sample for evaluation. Just call your local WEST office. Or mail the coupon to our Long Island City Headquarters, Dept. 16.

☐ Supply a dispenser and 5 lbs. of Lan-O-Kleen *PLUS*.

☐ Send a small sample of Lan-O-Kleen *PLUS*.

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PROGRAMS AND SPECIALTIES
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WEST DISINFECTING DIVISION

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radial location by hand, the ram squared and held the part; clamping was then effected and the ram withdrawn.

The machine, equipped with two standard Ex-Cell-O precision spindles at each end permits machining at one end while loading and unloading at the other. Holding close limits on diameters and concentricity, production with this machine is 180 parts per hour.

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★ modern machine shop ★

Automatic Machining Method Minimizes Cam Shaft Length

Chrysler Corporation's method of machining cam shafts at its Trenton Engine Plant is calculated to minimize the necessary length of the shaft and thus make possible a more compact engine design. This desirable arrangement is accompanied by the use of precisely located holes for timing and manufacturing purposes rather than extending the shaft.

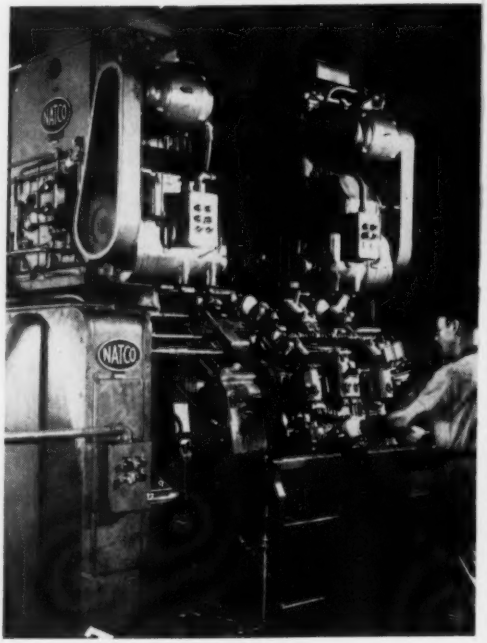
For machining the cam shafts, the Natco automatic shown in the accompanying illustration is used.

Cam shafts are manually loaded in a trunnion fixture which locates off the No. 3 exhaust lobe and clamps hydraulically. After each operation the trunnion indexes two positions so that two revolutions are necessary to complete a part.

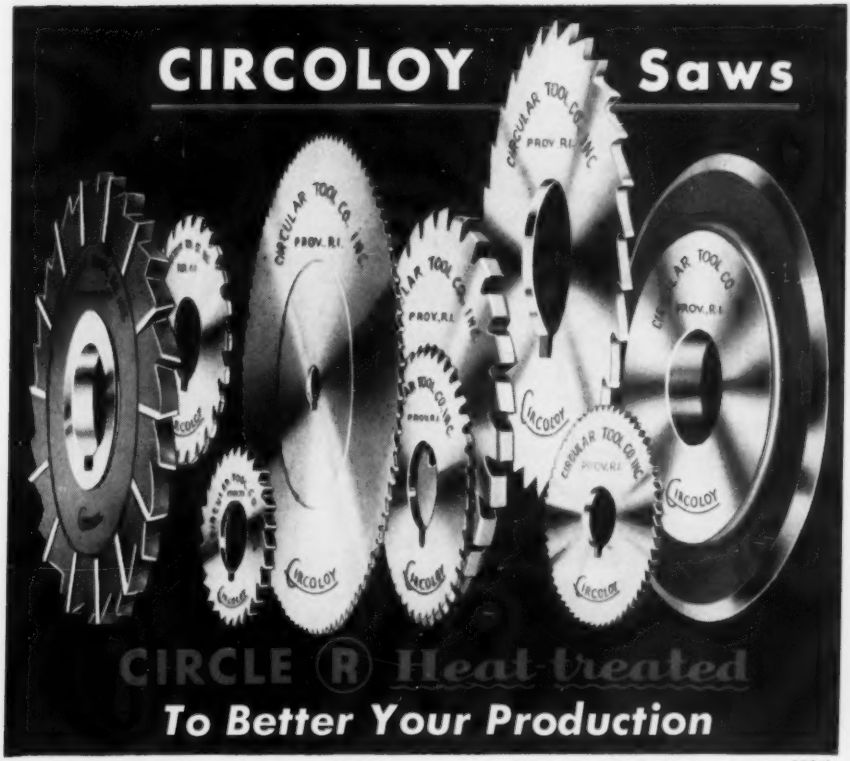
Operations performed on the cam shafts include milling both ends to length, rough and finish center drilling holes at each end, and drilling, chamfering, semi-finish reaming and finish reaming the timing hole. At the final position the finish machined parts are automatically unloaded onto a conveyor at a gross production rate of some 100 workpieces per hour.

Critical elements of the operation are original location in the fixture which determines proper clean-up when the lobes are ground, and a plus or minus 0.001 inch tolerance on both the timing and manufacturing holes.

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This Natco automatic, built by National Automatic Tool Company, Inc., has enabled Chysler Corporation's Trenton Engine Plant to machine cam shafts by a method which minimizes the necessary length of the shaft.



378-8

CIRCLE R exclusive heat treating renders Circoloy Saws shock-resistant, non-brittle. They greatly outperform HSS in service life, longer production runs, superior cutting, lower cost. Ask your Circle R Specialist when to use Circoloy, especially in automation.

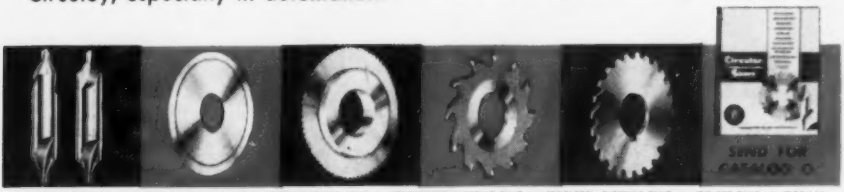
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DETROIT — A. D. Spruce
HACKENSACK — The Eaton Company
INDIANAPOLIS — Walter F. Greene & Assoc.
MILWAUKEE — Ford Tool Co.
MONTREAL — Humphrey B. Walton
NEW YORK CITY — J. B. Cremonin (Export)
PHILADELPHIA — General Tool Sales Co.
PHOENIX — DiEugenio Tool Center
PITTSBURGH — Ralph Esposito & Company
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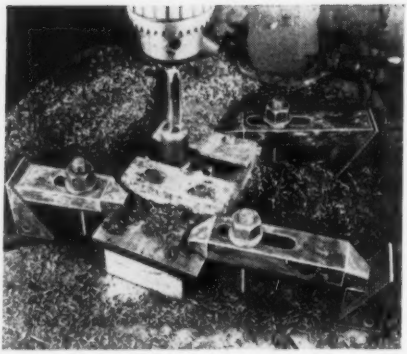
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More Production . . .

Step Blocks and Clamps Minimize Fixture Set-Up Time

Given a short-run production job which called for the drilling, tapping and spotfacing of 50 special hand knobs, Northwestern Tools, Inc., 119 Hollier Ave., Dayton 3, Ohio, devised the setup shown in the accompanying illustration to save time and thus show a profit on this small quantity order. As illustrated, a temporary fixture for holding the work was mounted on a Beckett drilling and tapping machine using three step block and clamp assemblies, which enabled the setup to be made in a mere 15 minutes. The complete job, including set-up time, drilling, tapping and spot-facing the 50 special hand knobs, required only 1 hour and 35 minutes.



Time-saving setup devised for the small-lot drilling, tapping and spot-facing of knobs.

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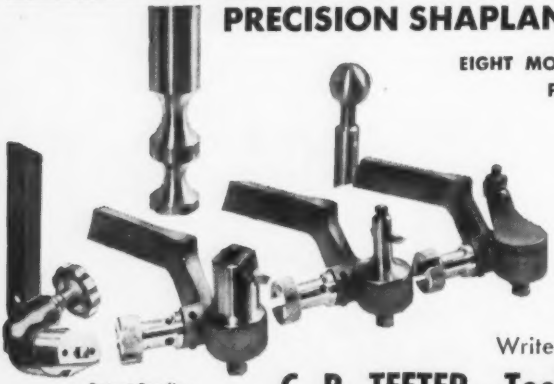


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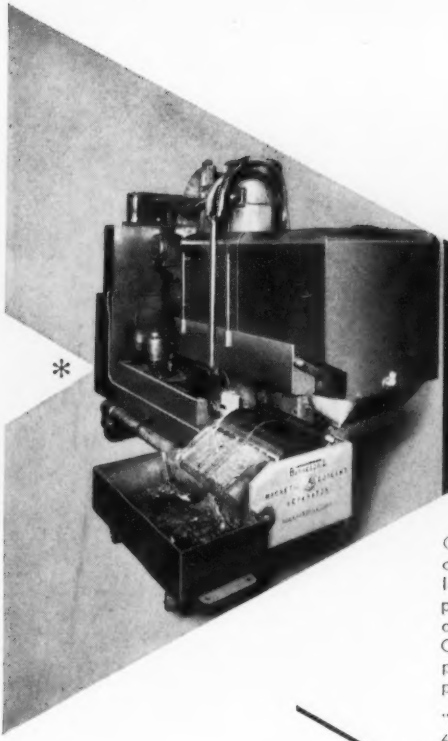
Patent Pending

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CUT maintenance, labor costs

INCREASE PRODUCTION!

Coolant fed into a Barnesdril magnetic coolant separator continuously circulates around the drum of powerful permanent Alnico magnets. Swarf, chips, and other ferrous particles are removed. Coolant is cleaned by the separator, thus preventing machine downtime and improving finishes.

a user reports:

"Our surface grinder (above) required 6 hours of cleaning and 5 gallons of coolant per week. With the Barnesdril magnetic separator installed, there has been no downtime in 4 months and coolant used has dropped to 1 gallon per week. *We cut our grinding costs* $65.50 per week. Paid for the installation in less than 2 months."

These savings are typical. Call your Barnesdril Factory Representative today or write for Catalog 350.

*Barnesdril Magnetic Separator #4 installed on a Blanchard No. 18 Surface Grinder.

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Specify Ex-Cell-O standard power units and cut your machine tool lead time

Today's demand for increased productivity, lower per-unit cost, even on relatively short runs, is being met economically by automatic, single-purpose, high-production machines—consisting essentially of a plain base and one or more Ex-Cell-O Quill-Type Hydraulic Power Units.

These standard, self-contained Ex-Cell-O Hydraulic Power Units are now being used for: drilling, counterboring, spot facing, reaming, as well as prime movers for milling equipment. Multiple operations may also be performed.

For the full story on the cost-saving advantages get in touch with your local Ex-Cell-O Representative. Or, if you prefer, write direct to Ex-Cell-O, Detroit.

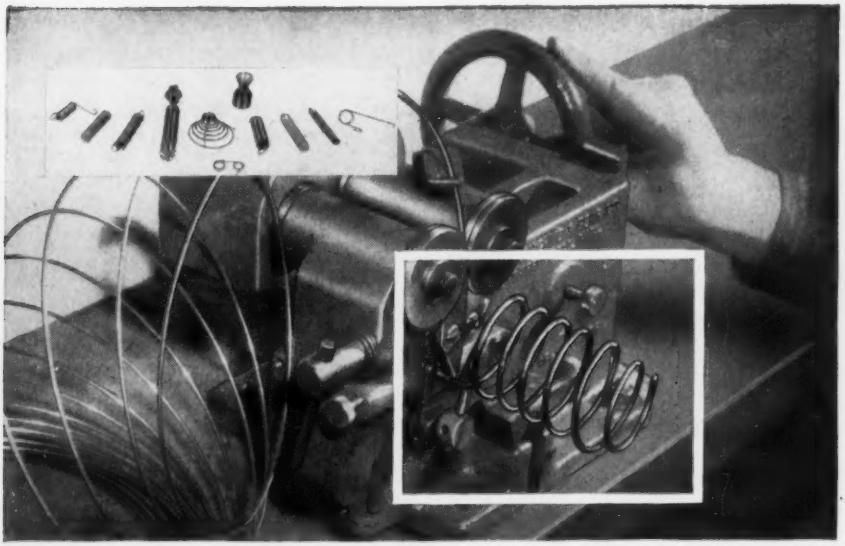
*Style 22—8-inch Stroke; Style 22-L—12-inch Stroke.

58-21R

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WITHOUT USE OF ARBORS

For a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005″ to .125″, you can produce it in a matter of seconds with Perkins Precision Spring Coiler. You eliminate arbors, yet turn out precision springs — torsion, compression, extension, tapered, or special springs, coiled either left or right hand, in any desired length, any diameter from 3/32″ to 12″ and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications as replacements or experimental work. Make them fast, right in your own shop!

PERKINS
MACHINE AND GEAR CO.
Special Machinery Division,
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Starrett adjustable jaw cut nippers (left) and Gardener Hook-Kon spring looping tool (center) — handy, precision, time-saving accessories for spring coiling. Perkins Spring Coiler available as bench model or power model shown here, (right) for tool shop or continuous runs.

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Special Machinery Division, Dept. D1
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Please send information and prices on Perkins Spring Coiler.
Hand Model ☐ Power Model ☐

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ideas from readers

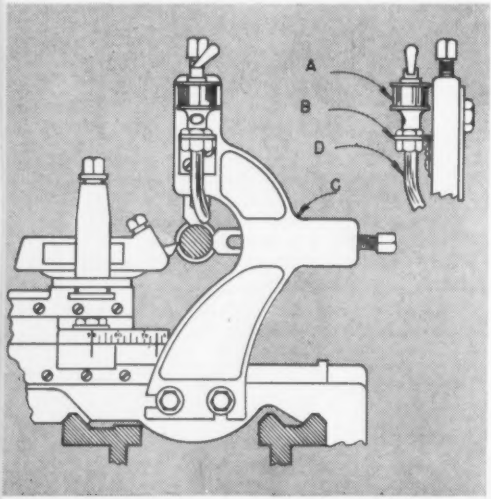
ideas from readers

Several time-saving ideas and suggestions for the man in the machine shop.

Self-Lubricating Follower Rest

By HAROLD SEDLIK

A lubricator mounted to a standard lathe follower rest, as shown in the accompanying sketch, has been found advantageous for minimizing heating or binding of workpieces when turning parts of considerable length at high revolutions per minute. The drip feed lubricator, *A*, is supported by a piece of angle iron, *B*, bolted to the side of the follower rest, *C*. A length of flexible or soft copper tubing, *D*, is connected from the lubricator outlet to direct the flow of oil to the jaws and work. The oil flow can be adjusted to suit the various turning conditions.



Sketch of self-lubricating follower rest designed to minimize heating or binding of work.

★ modern machine shop ★

Cutting Tool Grinding Fixture

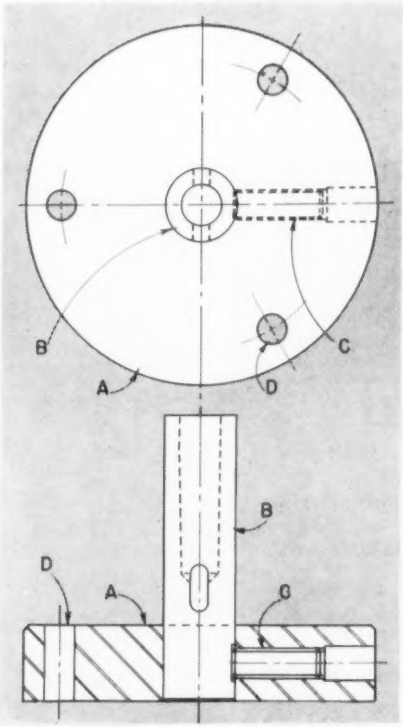
By ROGER ISETTS

Taper shank cutting tools, such as drills, reamers, spotfacers, and so on, are among the tools frequently worked on by tool grinders. The accompanying sketch shows a handy fixture that is designed to simplify the problem of holding such tools while being ground.

A round piece of cold rolled steel, *A*, of convenient size is center-bored to a slip fit for a standard taper shank drill socket, *B*. A second hole at right angles to the first hole is bored, tapped and counterbored to receive a headless set

screw, *C*, which holds the socket, *B*, firmly in place when inserted in the piece, *A*.

The fixture can be used in a vertical position, such as on a surface grinder, or horizontally on the faceplate of an indexing head. For horizontal use, three holes are bored through the piece, *A*, as shown at *D*, and are used to bolt the fixture to the faceplate. Grinding a tool in this fixture simulates the conditions under which it will be used and assures proper geometric alignment when the cutting tool is inserted in the spindle of the grinding machine.



Sketch showing top and side views of a simply made cutting tool grinding fixture.

LOW COST WAY TO CUT GRINDING COSTS



When you dress grinding wheels regularly you clean loaded pores, uncover fresh abrasive grains — GET NEW PERFORMANCE AGAIN AND AGAIN. Dressing makes every wheel more efficient. In the complete Desmond line there is a dresser to meet your requirement—at low cost. A typical Desmond-Huntington dresser* costs less than $3.00: replaceable cutter sets average 36c. Ask your Desmond distributor's advice.

The only complete line of grinding wheel dressers and cutters

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ideas from readers . . .

Double Vise Setup for Difficult-to-Handle Milling Machine Work

By H. J. GERBER

When milling on the ends of a long workpiece, we often use the setup illustrated herewith to facilitate holding the workpiece. A small drill press vise is gripped between the jaws of the milling machine vise, with the smaller vise resting on its side. The workpiece is then gripped in the jaws of the smaller vise, as shown. This arrangement will permit the lower end of the workpiece to extend downward past the milling machine table and thus allow the end that is being worked on to be gripped as closely as desired to the jaws of the small vise.

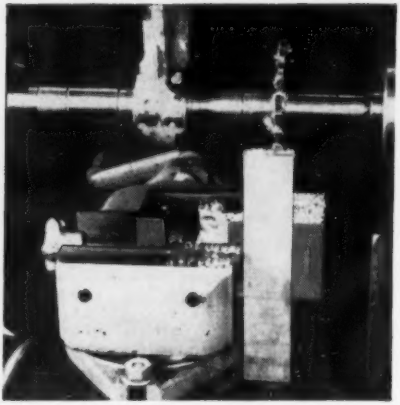


Illustration showing double vise setup for difficult-to-handle milling machine work.

eliminate GLAZE slowdowns with CERAMET

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Clipper's new and unique ceramic-vitreous bond provides longer life with less dressing. Holds the high, sharp free-cutting particles firmly, but also "knows when to let go." Does not fill or glaze, but always presents a fresh, sharp grinding surface to the work. Reduces costs.



Get Your Copy! *New Clipper Catalog DW58 sent on request. Let us have your grinding problems and requirements.*

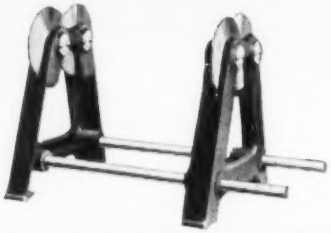
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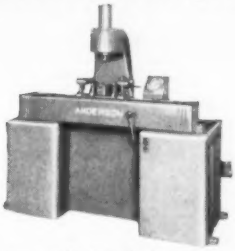
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Balance rotating parts easier, faster, more accurately. No leveling or centering required. Five sizes 20" to 96" swing, 1000 to 20,000 lbs. Precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings.

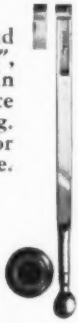
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Abrading Systems Co., 8020 North Monticello Ave., Skokie, Ill. Bulletin describes the Speedlap, a new approach to stock removal on flat surfaces.
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Band Saw Blades
American Saw and Manufacturing Co., Springfield, Mass. Form No. 1202. Flyer gives detailed information on Lenox High Speed Steel Band Saw Blades.
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Stow Manufacturing Co., 443 State St., Binghamton, N. Y. Bulletin 590. Design data on high speed flexible shafts.
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Composite Die Sections
Ohio Knife Co., Department HH-89, Cincinnati 23, Ohio. Bulletin CDS-100. Complete information on 1,000 Series O-Kni-Co Composite Die Sections.
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Marking and Numbering Machines
The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. Condensed Catalog. Acromark condensed pocket style catalog of equipment designed for plastics and metal marking.
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Abrasive Wheels and Segments
The Blanchard Machine Co., 64 State St., Cambridge 39, Mass. Form No. 394. Folder entitled "The Inside Story" provides a tour of the Blanchard Wheel Plant, in words and pictures, illustrating and explaining the many modern techniques and processes used in the manufacture and testing of abrasive wheels and segments for Blanchard Surface Grinders.
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Gear Checker
Michigan Tool Co., 7171 East McNichols Rd., Detroit 12, Mich. Technical Bulletin No. 607. Bulletin covers the low cost, compact and versatile gear checker, designed for roll checking the most widely used range of gear sizes.
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Electrolytic Machining Equipment
Anocut Engineering Co., 631 West Washington Boulevard, Chicago 6, Ill. Bulletin No. 130. Literature on how Anocut-Grinder combination saves time and material costs in the resharpening of milling cutters.
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Grinding Wheel Safety
The Carborundum Co., Niagara Falls, N. Y. Wall chart. Ten "Dos" and ten "Don'ts" of grinding wheel safety are listed brightly on a red, white and black 12 by 12 inch wall chart.
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Spindle Finishing Machines
Almco, Queen Products Division, King-Seeley Corp., Alberta Lea, Minn. Form A-24-S. Literature includes a step by step photo story, describing the Almco Spindle Finishing Method, pictorial "before and after" evidence of superior finishing obtainable and general specifications on each of the five new spindle finishing machines.
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Pneumatic Accessories
Arrow Tools, Inc., 1941 South Kostner Ave., Chicago 23, Ill. Catalog No. 50. Information on products such as filters, regulators, lubricators, drain traps, generators and other pneumatic accessories.
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Nuclear Power Development
The Babcock and Wilcox Co., Atomic Energy Division, 161 East 42nd St., New York 17, N. Y. Bulletin AEB-8. Engineers and others concerned with the development, application or erection of power, propulsion and research reactors, as well as nuclear componeents, will be interested in this catalog.
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Ground Flat Stock
Brown and Sharpe Manufaturing Co., Industrial Products Division, Providence 1, R. I. Bulletin M80. Combination catalog and price list showing the availability of the company's complete line of precision ground tool steel and low carbon ground flat stock.
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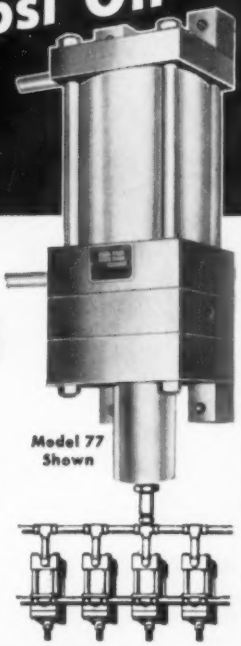
Bushings
Donley Products, Inc., 11106 Avon Ave., Cleveland 5, Ohio. New, six page catalog describes the advantages and applications of live roller bearing bushings in jigs and fixtures, special machines and automation equipment, and, also, the use of live bushings in horizontal milling machine outboard support applications.
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Micro-Drill
The Dumore Co., 1302 Seventeenth St., Racine, Wis. Form No. 63. Bulletin concerns the Series 27 Precision Micro-Drill that drills small holes quickly, accurately and economically with spade drills down to 0.001 or wire drills to 0.006 inch.
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Surface Grinder
Landis Tool Co., Waynesboro, Pa. Catalog CGS-59. Catalog describes and illustrates the complete line of Landis Abrasive Precision Surface Grinders.
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Modular Machines
Cleveland Hobbing and Machine Co., 1311 Chardon Rd., Cleveland 17, Ohio. Technical Bulletin No. 204. Specifications and engineering data on Cleveland Modular Machines, which are similar to the building block concept used for transfer machines.
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No Pumps or High Pressure Valving Needed

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Model 77 Shown

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Roll Feeds

Durant Tool Supply Co., 9 Thurbers Ave., Providence 5, R. I. A new catalog on automatic roll feeds covers specifications and prices for 15 standard feeds and accessories.

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Grinding and Buffing Machinery

The Cincinnati Electrical Tool Co., 367 Mt. Hope Ave., Cincinnati 4, Ohio. Catalog No. 59. Information on pedestal, snagging, disc, lathe and carbide tool grinders; buffing and polishing lathes, dust collectors, abrasive cut-off machines, speed lathes and special machinery components for grinding, polishing, milling, drilling and boring.

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Cemented Carbides

Allegheny Ludlum Steel Corp., Carmet Division, Department MS-16, Oliver Building, Pittsburgh 22, Pa. Catalog C-16-A. Reprint of a 32 page catalog, "Cemented Carbides for Industry," includes new and additional information on brazed tools, carbide inserts, toolholders and blanks.

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Universal Joints

Curtis Universal Joint Co., Inc., Birnie Ave., Springfield 7, Mass. Catalog C4-10M-12-58. Comprehensive catalog covering an entire line of single and double universal joints, complete with prices and specifications.

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Lapping-Polishing Machine

Syntron Co., 309 Lexington Ave., Homer City, Pa. Catalog section on Syntron Vibratory Lapping - Polishing Machines, which provide easy, mechanical polishing of metallurgical samples for microscopic examination and a fatigue reducing means of lapping metal parts for mating purposes.

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Screw Thread Data
The Eastern Machine Screw Corp., 40-50 Barclay St., New Haven, Conn. Volume V, No. 1. "Unified and American National Screw Thread Data."
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Abrasives
Clover Manufacturing Co., Norwalk, Conn. Catalog No. 55-C. Catalog contains both general and technical information on the company's abrasives.
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Presses
Dake Corp., 612 Robbins Rd., Grand Haven, Mich. Catalog No. 350A. This 16 page catalog features the complete Dake press line, including electric, air and hand operated hydraulic presses, arbor, utility and custom engineered presses for specialized applications.
For more data circle 32 on Postpaid Card

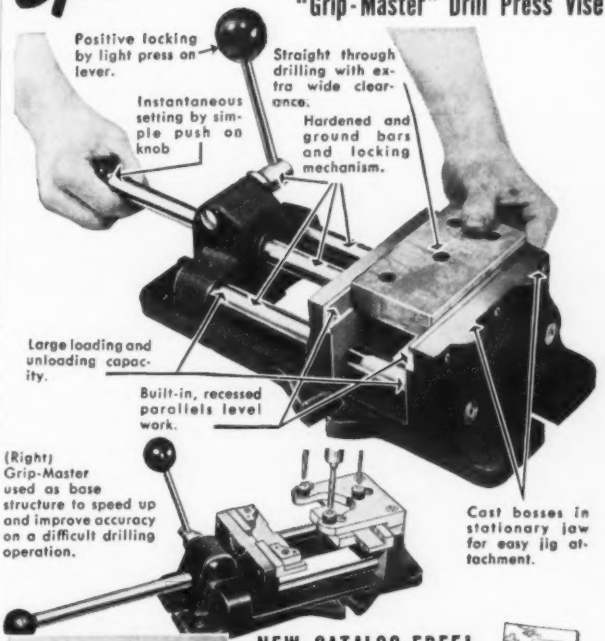
Control System
Blue M Electric Co., 138th and Chatham St., Blue Island, Ill. Bulletin No. 1950. Brochure describes Power-O-Matic Control System, the custom engineered control incorporated into mechanical convection ovens, sterilizers, incubators and environmental cabinets.
For more data circle 33 on Postpaid Card

Dust Collectors
Torit Manufacturing Co., Department 703, Walnut and Exchange Sts., St. Paul 2, Minn. Form Nos. 258, 358, 458, 558, 658 and 758. Series of six bulletins on the company's various series of high efficiency centrifugal separators.
For more data circle 34 on Postpaid Card

Diamond Wheels and Tools
A. I. T. Diamond Tool Co., 8207 North Kimball Ave., Skokie, Ill. Catalog No. 1058. This 38 page bulletin provides complete information on diamond wheels and tools. It gives technical information for correct diamond wheel applications.
For more data circle 35 on Postpaid Card

Material Handling Equipment
The Raymond Corp., 88-171 Madison St., Greene, N. Y. User Report No. 21. This report describes the problem and solution of a case involving the handling of long dies and fixtures.
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Packaging Products
Jiffy Manufacturing Co., 377 Florence Ave., Hillside, N. J. Descriptive literature is available on all Jiffy Packaging Products, including reinforced padded shipping bags and utliity bags, which are not padded.
For more data circle 37 on Postpaid Card

Contract Manufacturing Facilities
Taft-Peirce Manufacturing Co., Woonsocket, R. I. Catalog No. 814. This new bulletin, released by the Contract Service Division of the company, describes the newest contract manufacturing facilities available to general industry.
For more data circle 38 on Postpaid Card

Piercing Punch
Dayton Perforators, Inc., 1336 Stanley Ave., Dayton, Ohio. Four page bulletin describes the Jektole Piercing Punch that provides slug ejection with a retraction feature that permits sharpening without die disassembly. Flyer describes punch blank assortments.
For more data circle 39 on Postpaid Card

Production Center
Kearney and Trecker, 6784 West National Ave., Milwaukee 14, Wis. "How to Evaluate Milwaukee-Matic." Information on the Milwaukee - Matic, which is a machine tool designed to produce a continuous stream of finished parts, alike or different.
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Nibblers
Buckeye Tools Corp., 5013 Springboro Pike, Dayton, Ohio. Leaflet concerning the Buckeye Portable Nibblers, either air or electric.
For more data circle 41 on Postpaid Card

Arc Welding
The Lincoln Electric Co., Cleveland 17, Ohio. "Design Ideas No. 21." Information for saving material and money with arc welding.
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FISKE'S MAGIC COMPOUND



This Water Soluble Cutting Compound Stays Mixed

FISKE'S "MAGIC" COMPOUND, when dissolved in water, goes into a permanent emulsion—will never separate. It cools, lubricates and produces a high finish. Lengthens tool life. Does not become rancid. Try FISKE "MAGIC" COMPOUND and see the improvement in your work.

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129B Lockwood St., Newark 5, N. J.
Plants: Newark 5, N. J. and Toledo 5, Ohio
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Lathe Compound
Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, Long Island, N. Y. Two color leaflet on the newly designed compound for the Schaublin SV-70 Lathe.
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Small Motors
Barber-Colman Co., 7611 Rock St., Rockford, Ill. Bulletin No. F-9256. Information on the company's reversible shaded pole a.c. small motors.
For more data circle 44 on Postpaid Card

Heat Treating Furnaces
Hevi-Duty Electric Co., Milwaukee 1, Wis. Bulletin No. 653A. New 12 page bulletin describes briefly the complete range of electric and fuel fired heat treating furnaces and protective atmosphere generators.
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Indicator
Brush Instruments Division, Clevite Corp., 37th and Perkins, Cleveland 14, Ohio. Catalog No. ED-21717. Booklet entitled "Control the Finish and You Control Costs" features data on the company's Surfindicator.
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Cylinders
Petch Manufacturing Co., 463 York, Detroit 2, Mich. New 16 page condensus includes standard and special hydraulic and pneumatic cylinders and other related products.
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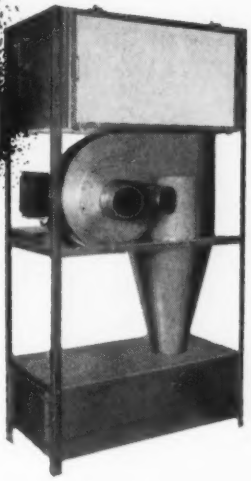
Bench Press
Geo. T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Ill. Pneumark Circular. Bulletin describes the Model 10-T Pneumark, which is a versatile and economical impact bench press.
For more data circle 48 on Postpaid Card

Contour Saw
The DoAll Co., Des Plaines, Ill. This 26 page brochure describes the Pan-Arm Contour Sawing Machine for fast, economical heavy machining.
For more data circle 49 on Postpaid Card

Spring Steel Stock
Uddeholm Company of America, 155 East 44th St., New York 17, N. Y. Completely new, 43 page spring steel stock list is available in handy booklet form.
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Dust Collection



Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

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Hand Grinder
M-F Engineering, 13828 South Western Ave., Blue Island, Ill. Four page leaflet on the new air jet hand grinder with pushbutton stop brake.
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Honing Machines
C. Allen Fulmer Co., 1211 First National Bank Building, Cincinnati 2, Ohio. This 15 page catalog gives complete information on Fulmer Honing Machines for fast, precision finishing of internal cylinders.
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Crankpin Grinder
C. E. Marsh, 2092 McKinley Rd., Northwest, Atlanta 18, Ga. Four page bulletin on a portable grinding machine designed to regrind crankpin journals on locomotive, marine and powerhouse diesel engines within the crankcase, without having to dismantle or remove any part of the diesel engine, except the connecting rod and piston from the crankpin to be ground.
For more data circle 53 on Postpaid Card

Boring Unit
The Heald Machine Co., Worcester 6, Mass. A 16 page brochure shows 14 different setups to illustrate how various operations can be combined on a unit type Model O Bore-Matic for automatic machining simultaneously or in sequence.
For more data circle 54 on Postpaid Card

Speed Lathe
The Schauer Manufacturing Corp., 4501 Alpine Ave., Cincinnati 42, Ohio. Catalog No. 580. New catalog describes the complete line of Schauer Speed Lathes.
For more data circle 55 on Postpaid Card

Dowel Pins
Safety Socket Screw Co., 6519 North Avondale Ave., Chicago 31, Ill. Consumer net prices on Blue Devil Dowel Pins.
For more data circle 56 on Postpaid Card

Prompt Service on RAYMOND Chrome Vanadium

DIE SPRINGS



Stock or Special Sizes

Medium, Medium-Heavy, Heavy Duty

Distributed by leading die set manufacturers

Wide variety of hole and rod sizes, lengths, deflections. Increased fatigue life. Reduced down time. *Write for specifications and price list, and name of nearest distributor.*

Raymond Manufacturing Division

Associated Spring Corporation

Corry, Pennsylvania

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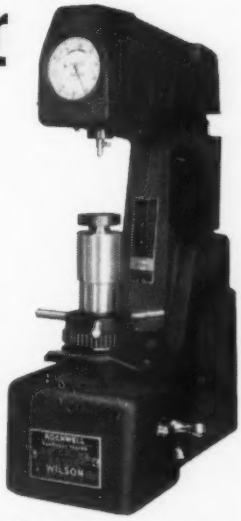
Vernier Magnifier
Bausch and Lomb Optical Co., 893 St. Paul St., Rochester 2, N. Y. Bulletin No. 1-93. Flyer describes and illustrates the new vernier magnifier.
For more data circle 57 on Postpaid Card

Grinding Fixture
M and M Tool and Manufacturing Co., Roto-Grind Department, Dayton 2, Ohio. Flyer describes the Roto-Grind Precision Grinding Fixture for surface or jig grinders.
For more data circle 58 on Postpaid Card

Intraform Machine
The Cincinnati Milling Machine Co., Meta-Dynamics Division, Cincinnati 9, Ohio. Publication No. M-2060. Bulletin describes the new Intraform Process, a new development in chipless machining.
For more data circle 59 on Postpaid Card

Hydraulic Cylinders
Miller Fluid Power Division, Flick-Reedy Corp., 7NO23 York Rd., Bensenville, Ill. Catalog sheet contains data on "Aids for Preventing Excessive Bearing Wear and Column Failures."
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One of these Wilson "Rockwell" instruments will do your hardness testing job



No matter what your hardness testing requirements are, there's a Wilson "Rockwell" tester to do the job. Choose from this complete selection of hardness testing equipment:

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Diamond "Brale" Penetrators—Flawless diamonds, individually calibrated, and highest quality construction assure perfect testing every time.

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WILSON "ROCKWELL" HARDNESS TESTERS

ACCO

Wilson Mechanical Instrument Division
American Chain & Cable Company, Inc.
230-G Park Avenue, New York 17, New York
For more data circle 432 on Postpaid Card

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Hydraulic Tracer
Retor Developments, Inc., Galt, Ontario, Canada. Four page bulletin on the Mimik Hydraulic Tracer, 3,000 Series, for vertical turret lathes and turning machines.
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Drill Blanks
Cleveland Twist Drill Co., 1242 East 49th St., Cleveland 14, Ohio. Bulletin No. AD-132. Folder describes Mo-Max High Speed Hardened and Ground Drill Blanks.
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Notching Tool
Vogel Tool and Die Corp., 1823 North 32nd Ave., Melrose Park, Ill. Four page, two color bulletin on the super fast tube and pipe notching tool, which notches clean with no extra finishing and no deformation.
For more data circle 63 on Postpaid Card

Fire Bath Process
Wilton Tool Manufacturing Co., Inc., Schiller Park, Ill. Catalog 707. Condensed C clamp catalog shows white hot C clamp parts being removed from Wilton's newly developed Fire Bath Process, which heats the parts to 1,600 degrees F.
For more data circle 64 on Postpaid Card

Power Presses
Famco Machine Co., 3122 Sheridan Rd., Kenosha 4, Wis. Form PCPP-1158. Features and specifications are concisely presented on the company's line of power presses.
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Boring Bars
Wesson Co., 1220 Woodward Heights Boulevard, Ferndale 20, Mich. Bulletin MB-1158. Eight page illustrated booklet describes more than 114 standard boring bars.
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Tracing Lathe
Jones and Lamson Machine Co., 539 Clinton St., Springfield, Vt. Form CO5810. Model 30 Auto-Tracer Lathe is described.
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Barry Machine Mounts CUT MAN-HOURS 90%



In new installations — In relocating machinery — you get savings like these!

3 man-hours instead of 42 man-hours to move machines at Johnson & Johnson

60% saving in new machine installation cost at American Type Founders

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Barry Leveling Machinery Mounts let you move machines wherever they are needed, and have them in full production in **minutes** — with no delays for drilling, lagging, or shimming.

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Salt Baths

John Swift Chemical Co., Inc., Canton, Conn. Form 254. Flyer includes information on heat salts, case for liquid carburizing and tempering compounds.

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Screwdrivers and Nutsetters

Airetool Manufacturing Co., Springfield, Ohio. Bulletin No. 68. Illustrated literature presents a completely new line of pneumatically operated screwdrivers and nutsetters.

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Valves

Hannifin Co., Department 166, 565 South Wolf Rd., Des Plaines, Ill. "Valve Finder" catalogs complete line of directional air control valves. It features an informative discussion of air valves and their selection, together with condensed listings of all Hannifin Valves.

For more data circle 70 on Postpaid Card

Cutting Tools

Formcraft Tool Co., 4500 Oakman Boulevard, Detroit 4, Mich. Catalog on products such as automatic recessing tools, boring bars and heads, special cutters, boring tools, cutting heads, end mills, reamers and tool bits.

For more data circle 71 on Postpaid Card

Wet Dust Collector

Dust Suppression and Engineering Co., Post Office Box 67, Lake Orion, Mich. Bulletin No. 581. Data on a wet dust collector that separates dust from the air by centrifugal action, while it also wets and traps dust by water.

For more data circle 72 on Postpaid Card

Feed Fingers

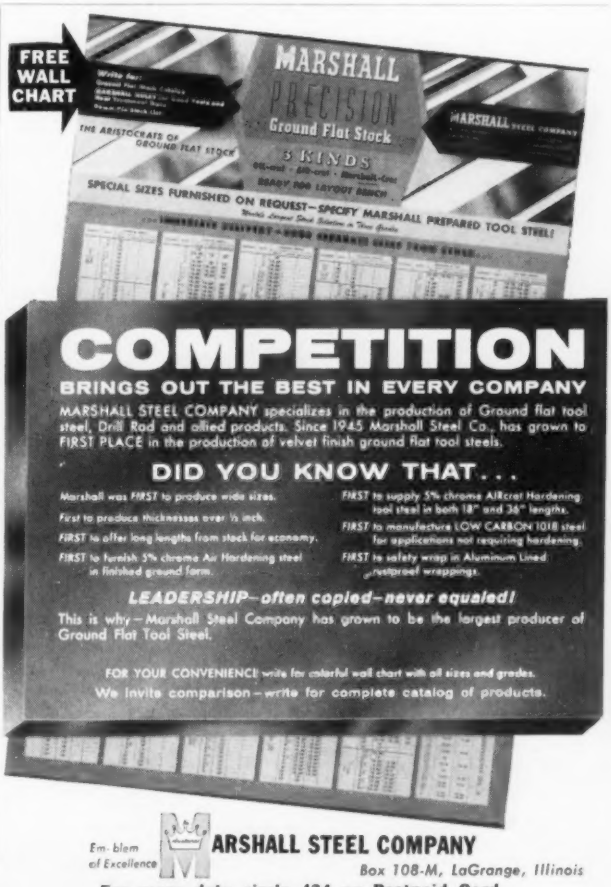
Green Manufacturing Co., 122 Prairie Ave., Rockton, Ill. Literature on Green Master Feed Fingers with adjustable rubber inserts for automatic screw machines.

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Facing Head

DeVlieg Microbore Division, DeVlieg Machine Co., Fair St., Royal Oak, Mich. Form No. MF-5M-58. Literature on MicroFace Adjustable Blade Facing Head for precision boring and facing or spotfacing wide surfaces without the use of special tooling.

For more data circle 74 on Postpaid Card



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Indexing Machine Chassis
Swanson-Erie Corp., 814 East Eighth St., Erie, Pa. Eight page illustrated brochure explains the advantages of turret type chassis for special purpose processing and assembly machines.
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Carbide Cutting Tools
Wendt-Sonis Co., Tenth and Collier Sts., Hannibal, Mo. Catalog Nos. 59 and 59-A. Two complete and fully illustrated catalogs show the large selection of carbide cutting tools, blanks and inserts manufactured by this company.
For more data circle 76 on Postpaid Card

Rotary-Compound Tables
The John B. Stevens Co., Main St., Somersville, Conn. Form No. 107. Bulletin describes and illustrates the company's rotary-compound tables, which feature longitudinal, traverse and circular movements.
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11393 E. Eight Mile Road, P.O. Box 3865
Detroit 5, Michigan, Engineering Dep't. M

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Solid Carbide Tools
The Atrax Co., Newington 11, Conn. Catalog No. 159. Large, factual 148 page catalog, price list and collection of engineering data on 1,230 standard stock, solid carbide tools and burs.
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Jig Borer and Grinder
Moore Special Tool Co., Inc., Bridgeport 7, Conn. Two color brochure on the No. 3 precision jig borer, No. 3 precision jig grinder and the universal measuring machine.
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Steel Drawer Cabinets
Equipto Division, Aurora Equipment Co., Aurora, Ill. Catalog No. 302. This catalog illustrates and describes the company's entire line of steel drawer cabinets.
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Face and End Mills
The Viking Tool Co., 1000 Nichols Rd., Shelton, Conn. Catalog No. 591. Catalog describes the complete line of Viking Indexable Blade Face Mills and End Mills, which eliminate the need for cutter sections in regrinding.
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Plating Service
Linde Co., 30 East 42nd St., New York 17, N. Y. "Linde Plasmarc Plating." Eight page booklet describes the new plasma arc service for metals in the high temperature range.
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Coolant
E. F. Houghton and Co., 303 West Lehigh Ave., Philadelphia 33, Pa. Data sheet completely describes Hocut No. 237, which is a new chemically conceived cutting fluid.
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Abrasive Belt Grinder
Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich. Bulletin 347-T. Bulletin concerns the 6 inch abrasive belt grinder, Model 600-P.
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Ceramic Tool Components
Duramic Products, Inc., 262-72 Mott St., New York 12, N. Y. Bulletin 116 is a four page catalog that describes a new line of off-the-shelf high temperature ceramic tool components, including a wide variety of bushings, washers, discs, plates, rods and vee blocks.
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Fluid Coupling Nuts
Standard Pressed Steel Co., Box 556, Jenkintown, Pa. Form 2488. Bulletin describes SPS Self-Locking Fluid Coupling Nuts — CN 8 Series for temperatures to 550 degrees F. and the CN 8C Series for temperatures to 800 degrees Fahrenheit.
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Tungsten Carbide Tools
Adamas Carbide Corp., Department 481, Kenilworth, N. J. Catalog No. 359. This 32 page catalog describes and illustrates the company's complete line of tungsten carbide tools, tool tips, dies, wear parts and Dex-A-Tools.
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Carbide Cutting Tools
Kennametal, Inc., Latrobe, Pa. Tool Manual, 1959 Edition. A 64 page pocket booklet designed to help machine operators, tool layout and tool maintenance men in the selection, application and maintenance of Kennametal Cemented Carbide Cutting Tools.
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Gears
Invo Spline, Inc., 2357 East Nine Mile Rd., Hazel Park, Mich. Form No. 158. New eight page catalog outlines the large stock of standard fine pitch master spur gears that are carried in stock.
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Tooling Plate
Kaiser Aluminum and Chemical Sales, Inc., Department NR-30, 919 North Michigan Ave., Chicago 11, Ill. Form No. 1-861. Rolled tooling plate, used to make industrial tools, jigs and fixtures, is described in this illustrated brochure.
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Diamond Wheels
Simonds Abrasive Co., Tacony and Fraley Sts., Philadelphia 37, Pa. Form ESA-290. This 48 page catalog contains con-

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sumer net prices for both man-made and natural diamonds, wheel shapes, diamond depths and concentrations.
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Rotary Table
Pratt and Whitney Co., Inc., 25 Charter Oak Boulevard, West Hartford, Conn. Flyer on a 24 inch tilting rotary table, modified for sidereal rate of rotation.
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Carbide and Steel Tools
M. A. Ford Manufacturing Co., 1545 Rockingham Rd., Davenport, Iowa. Comparative code listing and equivalent sheets are an aid in ordering and specifying solid carbide and high speed steel cutting tools.
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Inspection and Layout Fixture
Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn. Four page, two color bulletin describes and illustrates the new Roto-Mike, which is a single precision inspection and layout fixture.
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Hydraulic Cylinder
The Sheffer Corp., 326 West Wyoming Ave., Cincinnati 15, Ohio. Bulletin No. 159. Brochure describes the CLH Series universal, clevis or pivot mount 1⅛ inch hydraulic clamp type cylinders.
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Tap Extensions
The Walton Co., Hartford 10, Conn. Form No. 9500. Flyer presents complete information and prices for the company's new line of tap extensions or tap holders, designed for machine tapping operations.
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Vises
J. E. Martin Machine Co., Springfield, Ohio. Bulletin No. 21. Literature on Gem Vises which take the anxiety out of workholding.
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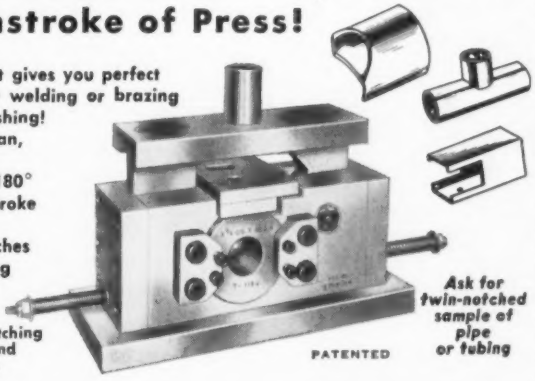
Thread Rolling Heads
Landis Machine Co., Waynesboro, Pa. Bulletin F-99-1. Information on No. 5 Series Thread Rolling Heads and No. 7 Series Stationary and Revolving Heads.
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Radial Drill
The American Tool Works Co., Cincinnati 2, Ohio. Bulletin No. 327. Information on the Maxi-Speed Hole Wizard Radial, a new era radial drill.
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the **ARC-TWIN** *Cuts Two Perfect Notches*
in *One* Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing! Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from ½" to 2⅜" O.D.; special units, up to 3" O.D.

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Rotary Tables
Troyke Manufacturing Co., 11296 Orchard St., Cincinnati 41, Ohio. Catalog No. 23. Brochure gives complete information on Troyke Rotary Tables, Roto-Indexers and cam locking tables.
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Electric Impact Tools
Ingersoll-Rand, 11 Broadway, New York 4, N. Y. Form PL-5252. Four page brochure describes ½ inch drive electric impact tools: 4U-SD standard duty, 5U-HD heavy duty and 5 UT with torque control.
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All Purpose Steel
La Salle Steel Co., Post Office Box 6800-A, Chicago 80, Ill. Bulletin No. 21. Helpful 24 page booklet entitled "How to Make Your Own Machine and Repair Parts Quicker and Easier."
For more data circle 102 on Postpaid Card

Nylon Drill Savers
Union Twist Drill Co., Athol, Mass. Four page bulletin presents the nylon drill saver, a new concept in driving sleeves for taper shank drills. A flyer on net prices is included.
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Centerless Grinder
Van Norman Machine Co., Springfield 7, Mass. Eight page, two color brochure on the Van Norman 2C Diversimatic Centerless Grinder that has a work capacity of 0 to 4¾ inches in diameter.
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Fabrication Problems
Wales - Strippit, Inc., 207 South Buell Rd., Akron, N. Y. General Catalog. This catalog describes the Strippit System of punching, notching, nibbling and drilling.
For more data circle 105 on Postpaid Card

Vertical Miller
South Bend Lathe Works, 425 East Madison St., South Bend 22, Ind. Six page, two color folder describes a vertical miller with power feed to table and spindle.
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The WELLS Model 600 Metal Cutting Band Saw

for Tool and Stock Room Service

•

for Medium Production Jobs



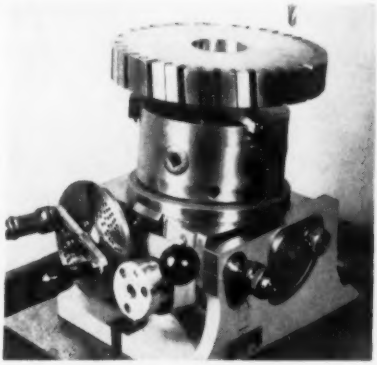
Rugged in design, dependable in operation, the Wells Model 600 is the ideal saw for tool and stock rooms . . . gives excellent service on medium production jobs. Uses ⅝" blade. Adjustable, uniform gravity feed is provided by hydraulic stabilizer and special coil spring. Casters available for portability. Write for Bulletin 260-A.

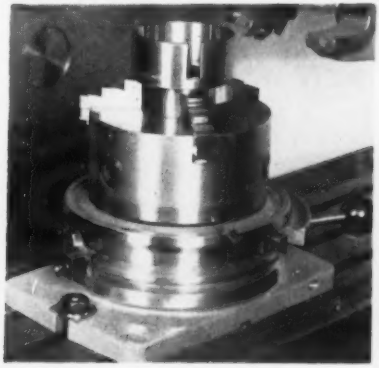
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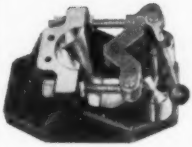
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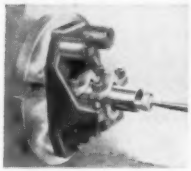
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LASSY WORKHOLDERS



A basic tool for many uses and with accessories provides many fast setups for production, eliminating the need for single purpose fixtures. Accurate to .0002.

Lassy Work Holders maintain repetitive work alignment and accuracy.



Write for New Illustrated Catalog on Time Saving Devices

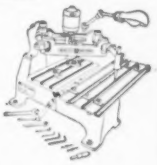
LASSY TOOL CO.
PLAINVILLE, CONNECTICUT

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WHAT'S YOUR ENGRAVING PROBLEM ?

- Need greater speed for engraving light and medium characters . . . use Preis-Panto Model UE or UE-2.
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- Marking metal of extreme hardness, electrical or diamond drag...use Preis-Panto UE-M or UM.
- Preparing hardened steel or glass for acid etching ask for Preis-Panto Model UA-M.

Preis is the "one source" solution for your engraving problems. Complete line of accessories and attachments are available for all makes and models.



There's a Model available to solve all your particular problems economically.

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Write for complete details and prices. For immediate attention write directly to manufacturer below. Ask for nearest representative.

H. P. PREIS ENGRAVING MACHINE CO.
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news of the industry

news of the industry

Acquisitions . . . newly appointed distributors . . . plant relocations . . . officers . . . services.

Edited by L. L. BALDHOFF

EASTERN MACHINE SCREW IN THE NEWS

At the annual stockholders' meeting of the Eastern Machine Screw Corporation, New Haven, Connecticut. Charles W. Wesson was elected president of the corporation and Carl W. Bettcher, the former president, was elected chairman of the board of directors.

The H and G Sales Corporation, a subsidiary of Eastern Machine Screw Corporation, has been appointed exclusive agent for the sales of the Russell Auto-Feed Screwdriver, which is manufactured by Russell Auto-Feed Screwdrivers, branch of Needle Industries, Limited, Studley-Redditch, England. This screwdriver is, like a tool, built in various models, whereby it can automatically feed and drive screws in a multiple of sizes, ranging from No. 0-80 to ¼ inch.

It is mounted in either a motorized bench driving stand or a floor model driving stand, equipped with the necessary air cylinders and electrical controls for foot pedal operation, so that it can be adapted for driving screws by hand operation, semi-automatically or fully automatically.

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MADISON-FAESSLER MOVES

Key personnel and plant equipment of the Madison-Faessler Company, Moberly, Missouri, have been moved to the Providence, Rhode Island home of its parent company; namely, Madison Industries.

In moving the plant, which has been manufacturing Microller Burnishing Tools and Recessing Tools, Madison Industries completes the final step in a program aimed at organizing all production, service and sales operations through one centralized source.

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MAHR GAGE COMPANY BECOMES NEW DISTRIBUTOR

Mahr Precision Measuring Tools, Gages and Inspection Instruments, made by Carl Mahr, Esslingen, Germany, are being distributed by the Mahr Gage Company, Inc., New York, New York. New showrooms and offices are located at 274 Lafayette Street.

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SERVICE FOR AIRCRAFT AND MISSILE INDUSTRY

Clearing Division, U. S. Industries, Inc., has announced the opening of a new Aircraft and Missile Division in Los Angeles, California. This division has been set up to work with the aircraft and missile industry in the development of special types of production machinery. The engineering function

is headed by Kingsley Drone. The teachnical sales phase is headed by Roland Guerin.

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LELAND-GIFFORD ANNOUNCES NEW OFFICERS

Leland-Gifford Company, Worcester, Massachusetts, has announced that William F. Leland has been elevated from president to chairman of the board of directors. Stanley B. Dowd was promoted from vice president to president. A. L. Wilkinson has been elected treasurer, in addition to his present duties as the executive vice president.

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CLEVELAND TWIST DRILL ACQUIRES BAY STATE TAP AND DIE

An announcement was recently made that Bay State Tap and Die Company, Mansfield, Massachusetts, has become a subsidiary of The Cleveland Twist Drill Company, Cleveland, Ohio.

Operations of Bay State will continue in Mansfield. Louis A. Lincoln will continue as president.

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POTTER AND JOHNSTON MOVES

All operations of the Potter and Johnston Company, subsidiary of Pratt and Whitney Company, Inc., have been moved from Pawtucket, Rhode Island, to the large, modern plant of the parent company in West Hartford, Connecticut.

Consolidating the engineering and manufacturing of both machine tool companies will give added facilities and more efficient manufacturing techniques to the Potter and Johnston line.

The new mailing address is: Potter and Johnston Company, Charter Oak Boulevard, West Hartford 1, Conn.

HOW TO INSURE TOP METALWORKING PERFORMANCE for only $100



Send for a trial order of CMD ANTI-SCORING LUBRICANTS

For top performance on lathe centers, grinding, press fit, stamping, die posts and many other operations—CMD ANTI-SCORING Lubricant can't be beat. It makes your operations smoother, faster, easier, and of course more profitable. Prevents scoring, seizing, galling... all bugaboos in modern machining work. This trial order will start *you* on *your* way to top performance where a high pressure lubricant is needed. You will be surprised to find how long it lasts. Get yours today in both oil and grease consistencies.

TRIAL ORDER— TWO FOUR OZ. TUBES $1.00

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CHICAGO MANUFACTURING AND DISTRIBUTING CO.

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news of the industry . . .

UNION TWIST DRILL NAMES DIRECTORS

At a meeting of the board of directors of Union Twist Drill Company, Athol, Massachusetts. Arthur E. Hamm was named a director of the company, to fill the vacancy existing through the death of William E. Loy.

Mr. Hamm joined the company in June, 1956, as controller and was elected treasurer and clerk of the corporation in September, 1956.

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BUCKEYE TOOLS ANNOUNCES NEW DIRECTORS

Buckeye Tools Corporation, Dayton, Ohio, recently announced that three new directors were added to its board. They are L. L. Warriner, E. J. Erp and Ben H. Mitchell.

Re-elected were A. G. Lauzon, president; Hal O. Gummere, executive vice president; E. B. Meynard, vice president-marketing; E. E. Reeves, treasurer; and E. B. Hamilton, secretary. John W. Humphrey and Ben P. Atkinson are also directors of the firm, which produces portable air tools for industrial use.

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E. C. BULLARD RETIRES AS CHIEF EXECUTIVE OFFICER

E. C. Bullard, chairman of the board of The Bullard Company, Bridgeport, Connecticut, has relinquished his duties as chief executive officer of the company to E. P. Bullard, III, president. Mr. Bullard, who has served in the company for the past forty years, will continue as chairman of the board of directors of this organization.



RELIANCE

Angle Dresser $37.50 **Radius Dresser $57.00**

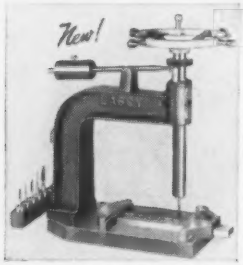
Shipped on 10-day Money-Back Guarantee

Angle Dresser guide block is hardened and honed, push bar is hardened and ground. Radius Dresser bearing adjustment is lifetime. Both tools are finished in black wrinx enamel. Diamond, $7.50.

Order direct. We pay postal charges.

RELIANCE TOOL & MFG. CO.
1919 Clybourn Ave., Chicago 14, Ill.

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LASSY

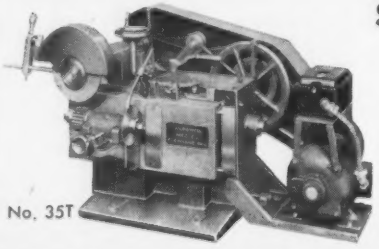
Supersensitive Hand Tapper

New exclusive features and top quality make Lassy Tappers outstandingly the finest available.

Write for New illustrated catalog on Time Saving Devices.

LASSY TOOL COMPANY, Plainville, Conn.

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SHARPEN YOUR SAWS
Automatically, In Gangs

Just think of it! 100 26 gauge saws sharpened at one time. Takes saws up to 5½" dia. and 1¾" thick. Saws are automatically indexed and sharpened within a variation of plus or minus .001 of exact diameter of entire lot.

WRITE FOR CIRCULAR 35T

THE WARDWELL MFG. CO.
3803 Ridge Road Cleveland 9, Ohio

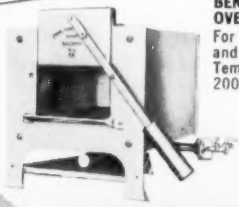
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NOTHING heats like... is more modern than... is more economical than... GAS

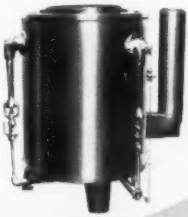
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INDUSTRIAL GAS BURNERS & FURNACES

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BENCH TYPE OVEN FURNACES
For heat treating and pre-heating. Temperatures to 2000° F.



ATMOSPHERIC POT FURNACES
For cyanide, salt bath and lead hardening. Temperatures to 1650° F.

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HOLES



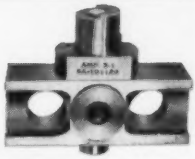
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Clark "HOLE MAKER"

P. O. BOX 990 BEVERLY HILLS, CALIF.

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OFFERS 5 to 1 AMPLIFICATION

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HOLMES GAGE & DEVELOPMENT CORP.
Columbus 3, Ohio

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new shop equipment

new shop equipment

Descriptions of new machines, tools and materials for metalworking.

INTRAFORM MACHINE

A new process of chipless machining, announced by the Meta-Dynamics Division, The Cincinnati Milling Machine Co., Cincnnati 9, Ohio, consists of cold forming cylindrical workpieces, such as tubes or rings, to obtain profiles on the inside diameter. The machine which performs this operation is appropriately named Intraform.

A mandrel is inserted in the work prior to it being squeezed by rapidly pulsating dies. At the completion of the operation, the profile of the mandrel has been reproduced in the i.d. of the part. Tensile strength and surface finish have been improved. Inside diameter profiles produced by the machine range from heat exchanger fins to the highly accurate lands and grooves in rifle barrels.

There are four forming dies, pulsating rapidly while revolving around the o.d. of the work. Dies are mounted on cams which contact a series of freewheeling, hardened steel rollers located in the machine headstock. The top surface of the cam has the form of a

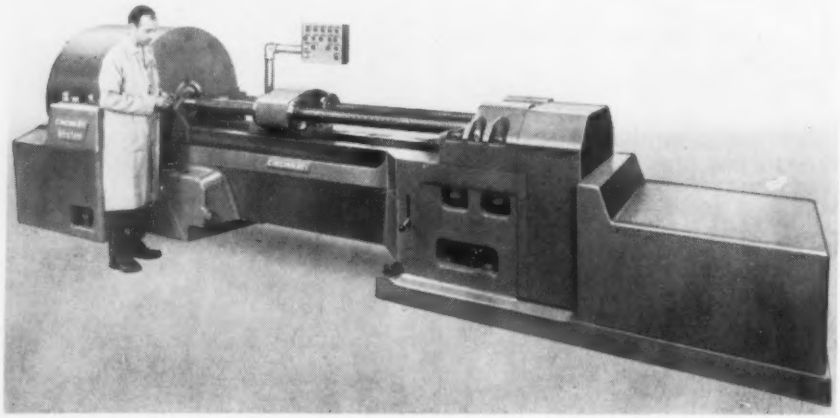


Figure 1—The Cincinnati Intraform Machine that is shown above is a new member of The Cincinnati Milling Machine Company's "chipless machining" family of machine tools.

and shop materials

new shop materials

Edited by L. L. BALDHOFF

sine curve, and at no time looses contact with the rollers. A smooth, continuous squeezing action results, occurring more than 1,000 times per minute.

Contact with the rotating dies causes the part and mandrel to revolve, but at a somewhat slower speed than the dies. At the same time, the work is fed over the mandrel and toward the rear of the headstock. Since only the workpiece has a feeding traverse, long work may be internally formed with a short, relatively inexpensive type mandrel.

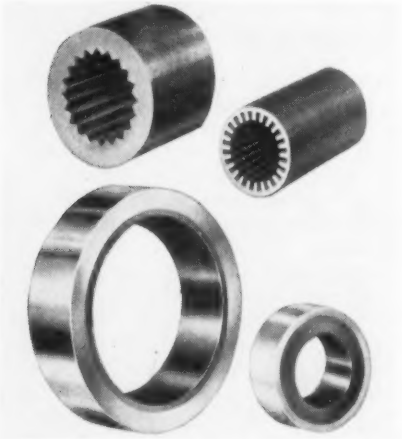


Figure 2—Typical parts that have been internally formed on an Intraform Machine.

Intraform forming can be applied to any type of ferrous or non-ferrous parts ranging from about ⅛ inch to 5 inches in diameter, and made from premachined blanks, tubing, castings, forgings or extrusions. In addition to forming profiles in open or blind holes, laminated tubing can be made by form-bonding two or more metals. The bond is exceptionally strong and tight. Forming operations for which a mandrel is not required also may be performed on tubular and solid work. These include pointing, reduction of diameters and forming of taper and radius.

Intraform cold forming improves physical properties. It is said that tensile strength can be improved as much as 30 percent. In addition, the continuous flow lines created in the profile formed area greatly add to the fatigue life of the part in service.

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HONING MACHINE

Barnes Drill Co., 860 Chestnut St., Rockford, Ill., announces that the BarnesdriL Model No. 4014 Three Spindle Vertical Type Honing Machine, shown in the illustration, is the first No. 4014 machine with individually controlled pneumatic hone feed for each spindle. The improved design

allows hone feed pressure calibration for each spindle to compensate for varying operating conditions caused by bore size irregularities and different degrees of stock hardness. The results include shorter cycle time, improved bore conditions and reduced stone wear.

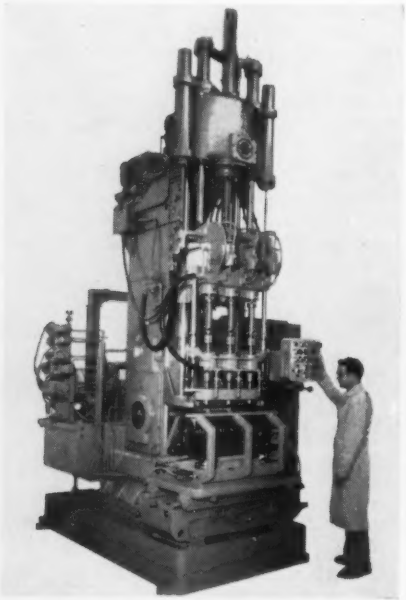
The honed bore characteristics are better with the individual hone feed. Taper and out-of-round bore conditions are less pronounced and close bore size tolerances are maintained by proper control of hone feed pressure. This pressure control on the honing stones in each tool prevents rapid stone wear due to forced cutting induced by inter-tool pressure variances. With this system, it is possible to use coarser stones for faster stock removal and still hold a closer r.m.s. tolerance range.

An automatic feed clean-up timer is actuated when all three bores are sized out and the tools have collapsed, yet continuing rotation. The tools expand simultaneously under constant low pressure to the walls of the bore. The timer gives a predetermined number of strokes to obtain the desired surface finish. From three to five extra strokes are generally needed to apply the required finish.

Approximately 0.003 stock is removed from the fine bored cylinder walls of the six cylinder cast iron blocks being honed on this machine. Use of a three spindle auxiliary head requires one index to complete the honing of the part.

The BarnesdriL Model No. 4014 Honer is equipped with a 25 inch hydraulic spindle stroke and Plugmatic Bore to Bore Sizing. Two 15 h.p. motors power the machine, one for the hydraulic system and the other for the spindle drive.

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BarnesdriL Model No. 4014 Honing Machine

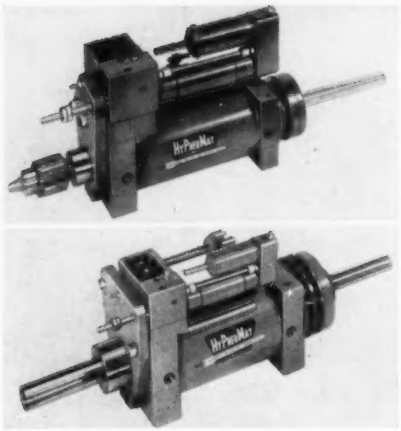
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DRILLING AND TAPPING UNITS

Hypneumat, Inc., Milwaukee, Wis., announces its line of long stroke automatic drilling and tapping units. These units range in strokes up to 25 inches. The lighter duty units are manufactured in stroke lengths to 12 inches; the heavy duty units in stroke lengths to 25 inches.

They supply the power for dozens of every-day drilling and tapping operations, plus multi-diameter step machining and other difficult chores.

Hypneumat Automatic Drilling and Tapping Units can be easily interlocked with indexing tables, automatic work feeders and fixtures. A quill extension permits extremely close radial grouping and can be effectively



Series 300 and 500 Drill and Tap Units

used for multi-spindle drilling and tapping, as well as cavity drilling.

There are over 40 standard models available, in addition to specials.

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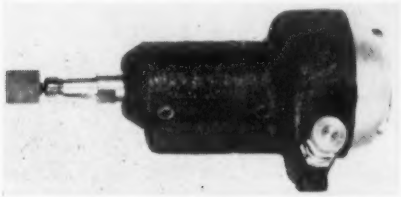
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HAND GRINDER

M. F. Engineering, 13828 South Western Ave., Blue Island, Ill., announces an Air Jet Hand Grinder with a speed of 75,000 r.p.m. It has a very convenient pushbutton stop brake and new speed regulator for rotary files and burrs.

Where it has been tested, it has proved to be a great labor time saver in tool shops, forge shops and many other industrial plants.

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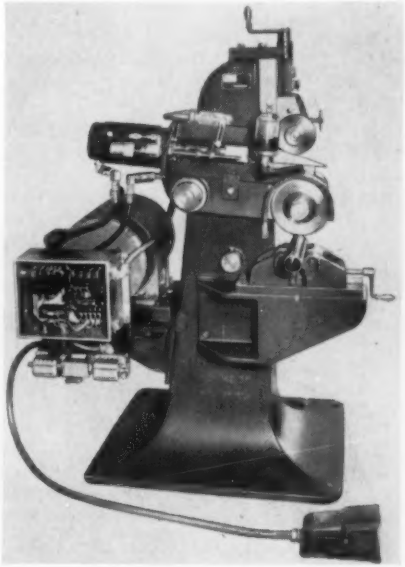


Hand Grinder has speed of 75,000 r.p.m.

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CUT-OFF MACHINES

Continental Machine Co., 2345 West Nelson St., Chicago 18, Ill., announces that users of Continental Rotary Pipe and Tube Cut-Off Machines with J.I.C. features can expect increased production rates and lower costs per cut length of pipe or tube. These models with hydraulic power checks were designed to fit the needs of a panel of typical users whose needs ranged from smallest and lightest gauge tubes to heavy walled pipes in diameters up to 12¾ inch o.d. Chief demand was for faster wheel approach to the work, precision control of cutting even on thin wall large o.d. tubing and a fast return of the wheel to normal position.



Continental Pipe and Tube Cut-Off Machine

The company achieved the increased speed and precision control by designing the machines with J.I.C. electronic and hydraulic components. Now more pipes can be cut each day and a whole new group of exceptionally thin wall tubing can be cut without a toe-in of the cut edge. The hydraulic power check achieves a smooth cutting stroke by keeping the exact uniformly regulated cutting pressure on the wheel and work. The erratic feed is completely eliminated.

The J.I.C. featured machines cut pipes and tubes from $\frac{3}{8}$ inch to $12\frac{3}{4}$ inches o.d. from light gauge to $\frac{1}{2}$ inch wall thicknesses.

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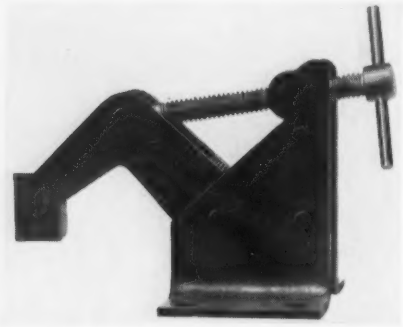
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SMALL FIXTURE CLAMP

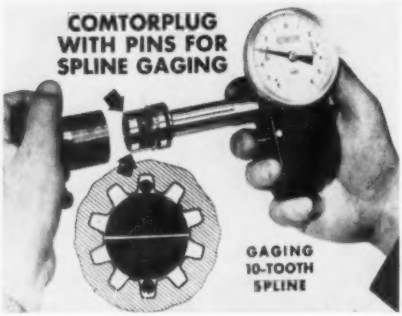
Saxton Mfg. Co., Inc., 1517 North Potrero, El Monte, Calif., announces a really small fixture clamp in the Kant-Twist line.

It is a 2 inch fixture clamp and has all of the features of the larger fixture clamps.

For more data circle 112 on Postpaid Card



View of Saxton Small Fixture Clamp



Comtorplug is gaging a ten tooth spline

SPLINE GAGE

The Comtor Co., 64 Farwell St., Waltham 54, Mass., announces the addition of gage wires to its expanding plug for cylindrical holes. Comtorplug now provides a gage for directly checking the between pins dimension of splines and internal gears. The gage may be designed for either odd or even tooth work. The gage dial provides a fixed reading of the dimension, with large 0.0001 inch graduations. Gages of this design are applicable to work having between-pins dimensions from approximately $\frac{3}{8}$ inch to 10 inches. Zero setting is done in a plain ring gage.

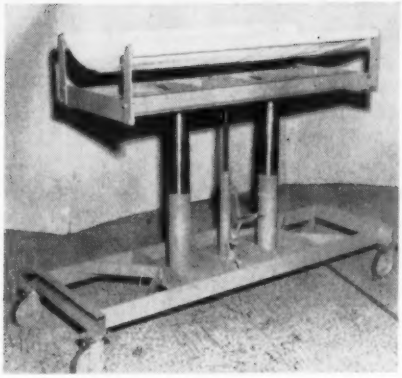
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HYDRAULIC PORTABLE ROLL HANDLER

Lexco Eng. & Mfg. Corp., 20 West Chestnut Street, Souderton, Pa., announces a hydraulic portable roll handler for handling cellophane rolls or any roll material which requires careful handling.

It easily and efficiently handles rolls up to 22 inches in diameter and 72 inches long, weighing up to 1,000 pounds. Size: the top is 48 inches long by 22 inches wide. The base is about 6 feet long by 24 inches wide.



Lexco Portable Hydraulic Roll Handler

It has four swivel rubber tired casters and is highly maneuverable.

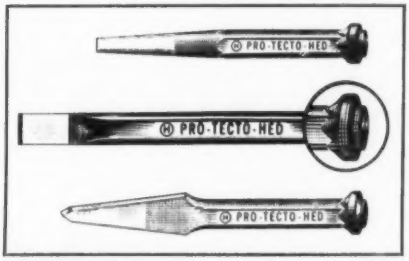
It can be raised by hand or foot pump from a low of 26 inches to a high of 39 inches measured from the bottom of the roll to the floor.

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CHISELS AND PUNCHES

The Cincinnati Tool Co., 1947 Waverly Ave., Cincinnati 12, Ohio, announces its Pro-Tecto-Hed line of chisels and punches for greater safety and longer life. The raised upset head defeats mushrooming and chipping, affording greater safety and long life.



The Pro-Tecto-Hed Punches and Chisel

Trip-hammer forged from special analysis steel, each tool is tested for hardness and toughness before going into stock, and they comply with all federal specifications.

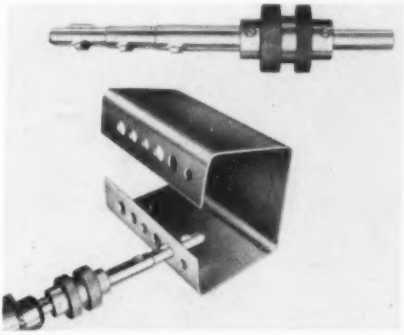
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SPECIAL PURPOSE TOOL

Nobur Mfg. Co., 6860 Farmdale Ave., North Hollywood, Calif., announces a special tool that has three separate pilot diameters and a cutter blade with three correspondingly positioned cutting heads. It is used in a portable drill-motor and deburrs the front and back hole faces of three different size holes without separate tool changes. As a safety feature, passage of the tool through to the working hole surface is made with cutter retracted.

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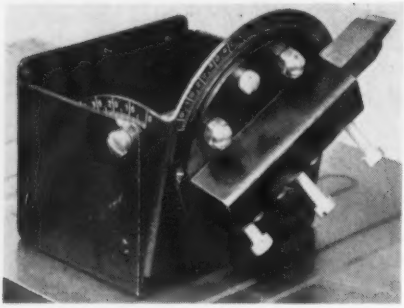


The Single Special Purpose Nobur Tool

GRINDING FIXTURE

A low cost tool bit grinding fixture for use on surface grinders is offered by Montgomery and Co., Inc., 411 Morris Ave., Springfield, N. J.

This unit is of sturdy, pressed steel construction, with precision ground master surfaces. It quickly sets up for any combination of rake and clearance



Tool bit fixture for surface grinders

angles and grinds all sides in one setting. It holds any single point tool such as threading, box, boring and lathe tools. Inexpensive enough to allow you to set up one fixture at each machine for fast duplicate tool bit grinding.

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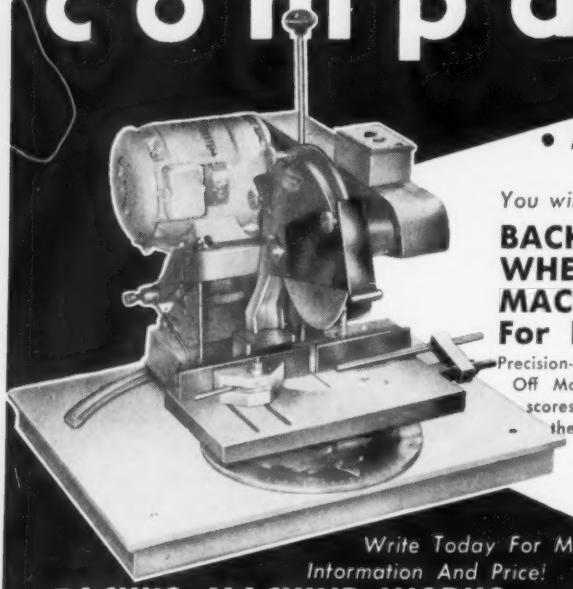
★ modern machine shop ★

CARBIDE

Kennametal Inc., Latrobe, Pa., announces that Kennametal K11, a carbide with a hardness of 93 Rockwell A, is now a production grade of Kendex Button Inserts.

Since its introduction as a specialty grade in 1955, it has given exceptional performance in finishing and light roughing of cast iron, alloyed cast iron, brass, bronze and light alloys.

compare



• SPEED
• ACCURACY • QUALITY
• PRICE

You will know the best buy is . . .

BACKUS ABRASIVE WHEEL CUT-OFF MACHINES For Ferrous Metals

Precision-built Backus Abrasive Wheel Cut-Off Machines have won acceptance in scores of plants and shops throughout the country. Bars, shapes and tubing of steel and alloys are cut quickly and accurately at any angle. Operates with 12 inch abrasive wheel.

Write Today For More Information And Price!

May Be Used For Non-Ferrous Metals With Simple Conversion Unit!

BACKUS MACHINE WORKS

ROUTE 17, CARLSTADT, N. J.

SINCE 1914

For more data circle 451 on Postpaid Card

PUSH BUTTON *Speed Selection*

from  to  in seconds



or to *any* intermediate speed, *instantly*

Just push a button and watch the large tachometer dial on the headstock!

It's that easy!

The work is done by a motor driven speed changer. It accelerates or slows the lathe to any desired speed in seconds. With a 10:1 ratio, this new variable drive makes it easy to select from a wide range of speeds—200 to 2000 rpm in direct drive and 40 to 300 rpm in back gear.

Maximum stability and smooth power transmission are assured because the drive unit is oversized. All pulleys and shafts are fully supported (eight bearings). Double V-belts throughout the drive eliminate slippage and deliver full power to the spindle. Because of this rigidity and extra pulling power, this lathe will take heavy cuts at all speeds and precision finish cuts at high speeds.

It is a precision lathe, moderate in price, with the versatility for toolroom, production or second operation jobs.

SHELDON *Variable Speed* PRECISION LATHES



Illustrated
WM56P
13" Swing- 34" Centers
Base Price F.O.B. Factory
$2146.00
Less Chip Pan and Electricals
Also available with 11" Swing

Write for
"Variable Speed" Circular and General Catalog showing . . .

- 10", 11", 13" and 15" SHELDON Precision Lathes (Bench, Pedestal and Cabinet types)
- 13" and 15" SEBASTIAN Geared Head Lathes
- SHELDON Milling Machines
- SHELDON Back Geared Shapers

SHELDON MACHINE CO., INC.
4250 N. Knox Ave. • Chicago 41, Ill.

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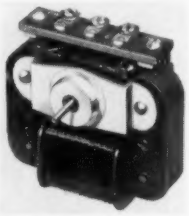
Today K11 is used under certain conditions for light cuts on steel, as well as for machining unfired ceramic materials, resin materials and plastics. It has been found particularly suitable for such precision operations as boring brake drums, machining cam shafts and finishing pistons and sleeves. K11 is also recommended for die inserts for compacting ceramics, abrasive wheels and other applications where abrasion is severe. Kennametal K11 is stocked in 15 precision ground Kendex throw away inserts.

For more data circle 118 on Postpaid Card

★ modern machine shop ★

TACHOMETER GENERATOR

Barber-Colman Co., Small Motors Division, 7611 Rock St., Rockford, Ill., announces a reversible shaded-pole motor, which fulfills the requirements of an a.c. tachometer or rate generator. With rated a.c. voltage applied to the main winding, a voltage is generated in the shading windings, which is proportional to the speed at which the rotor is driven. Voltage is nearly linear from 1,000 to 3,000 r.p.m. Generated voltage from a typical AYAE rate generator with low impedance shading coils (150 ohms) is two volts per thou-



Barber - Colman Generator



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2548

DIEMAKERS!

this

DIE-PART PORTELVATOR®

(OR AN ENGINEERED VARIANT)

will speed your work
and ease your "handling."

Top plate raises and lowers for fitting operations and rotates 360° to give easy access to die.



Write for our
FREE Bulletin No. 2548.
It gives full details.

THE HAMILTON TOOL COMPANY · 828 SOUTH NINTH ST.

HAMILTON · OHIO · U. S. A.

For more data circle 454 on Postpaid Card

sand r.p.m. and can be increased to ten volts per thousand using shading coils of higher impedance.

For more data circle 119 on Postpaid Card

★ modern machine shop ★

POWER DRILLS

Whitman and Barnes, Plymouth, Mich., announces a complete line of short length, heavy duty power drills.



Whitman and Barnes Heavy Duty Power Drill

These drills are the same length as screw machine drills, but feature a heavier web construction. According to the manufacturer, this combination of short lengths and heavy duty design enables them to withstand considerable strain and drill successfully when full length drills may fail. These drills are particularly suitable for use in portable electric drills and in the drilling of sheet metals, stainless steel, monel metal and other hard materials.

Factory pointed with 135 degree split points, it is reported that these drills provide fast, sure penetration in sheet metals and when drilling curved surfaces. They are available in fractional, wire gauge and letter sizes and in sets.

For more data circle 120 on Postpaid Card

★ mms ★

COOLANT FOR ABRASIVE CUTTING

Campbellene, a cool-blue coolant concentrate containing Odormask, a highly

INTRODUCING...

3 NEW KNU-VISE CLAMPS

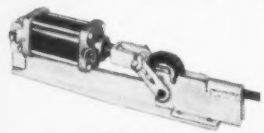




P&P-1200
Hand Push-and-Pull Clamp



P&PSB-1200
Hand Push-and-Pull Swivel-Base Clamp



AOP&P-1200
Push-and-Pull Air-Operated Clamp

WRITE TODAY FOR COMPLETE INFORMATION

Push the handle! Pull the handle! It makes no difference—the new Knu-Vise clamps by Lapeer give you uniform clamping of parts. That's real performance! Look at these features—

90° handle motion produces lock of plunger for push or pull without resetting of handle. Handle is reversible. Plunger guided by two widely separated, hardened steel bushings for accuracy in motion and minimum wear. Built-in deflection provides uniformly tight clamping of parts with normal variation in thickness. Swivel base model provides 90° total change in direction of plunger motion. The air (or oil) operated model, AOP&P-1200, produces approximately 4½ times the clamping force with 85 p.s.i. than the cylinder would alone. Failure of air (or oil) pressure does not permit reverse motion of plunger, thus not affecting clamping force.

All parts easily replaceable.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

KNU-VISE PRODUCTS **LAPEER MANUFACTURING CO.**

3048 DAVISON ROAD
LAPEER, MICHIGAN

WESTERN DIV.: PECK and LEWIS CORPORATION
4436 Long Beach Ave., Los Angeles 58, Calif., ADams 3-7146
CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.
1131 Pettit Road, Burlington, Ontario

For more data circle 455 on Postpaid Card

effective deodorant, and formulated for use with all makes of abrasive cutting machines and most types of grinding operations, is presently available from Allison-Campbell Division, American Chain & Cable Co., Inc., 931 Connecticut Ave., Bridgeport 2, Connecticut.

According to the company, this cooling agent keeps abrasive wheels clean and sharp; promotes extremely rapid chip settling; improves cut quality; minimizes odors; does not foam; inhibits rusting of machine and parts; retains full effectiveness for long periods of heavy production; and, under certain operating conditions, it will increase wheel life by 15 to 20 percent.

Being chemical in nature, the coolant concentrate will not support bacterial growth and cannot turn rancid.

Under normal working conditions, Campbellene Coolant Concentrate should be used in proportions of 1 part coolant to 150 parts of water.

The product is available in 1 gallon cans, cartons of six 1 gallon cans, 5 gallon pails, 14 gallon quarter - drums and in 55 gallon drums.

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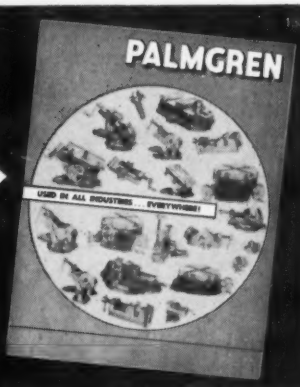
MACHINE TOOLS ARE CALIBRATED TO INTERNATIONAL INCH

Moore Special Tool Co., 730 Union Ave., Bridgeport 7, Conn., announces that its machine tools incorporate calibrations in the new standardized International Inch, which officially becomes effective July 1 throughout all English-speaking countries. Machines include jig grinders, jig borers and universal measuring machines.

WRITE NOW FOR THIS

FREE CATALOG

ON WORK HOLDING TOOLS FOR PRODUCTION, TOOLING, MAINTENANCE



Drill press vises, angle vises, swivel machine vises, rotary tables, lathe milling attachments, production vises, heavy duty angle vises, and adjustable angle plates are illustrated and fully described in the New Palmgren Catalog. This is the only complete line of work holding devices available anywhere. Designed for production, tooling, and maintenance work, there are 68 different models and types to choose from. Vise jaw sizes are from 1½" to 8". Ask for your copy of this FREE Catalog No. 205 today. The complete line with details and prices are shown.

PALMGREN PRODUCTS

by CHICAGO TOOL AND ENGINEERING CO.

8399 SOUTH CHICAGO AVE. • CHICAGO 17, ILL.

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new shop equipment . . .

Official announcement of the adoption of the International Inch was made on January 1 by the National Bureau of Standards, giving a six month grace period for industry to make the necessary adjustments in measuring systems. After July 1, the Bureau of Standards announced it will calibrate all length measures and gage blocks in terms of the new figure, which is 2 millionths less than the present U.S. inch, and 1.7 millionths greater than the British Imperial inch. The new standard inch coincides precisely with the Canadian inch, which is equivalent to 25.4 millimeters.

The importance of this difference of 2 millionths of the former U.S. inch is evident in the new Moore Universal Measuring Machine, which provides for a tolerance of only 35 millionths of error in a longitudinal travel of 18 inches. If the new calibrations were not incorporated, machines could double the tolerance of error owing to the additional error built in by using the old U.S. inch. The Moore Measuring Machine is capable of measuring in terms of one-third of ten thousandths of an inch—a capability designed to provide the required ultra-fine precision in measurement needed in the missile age.

The new Model No. 3 Moore Jig Grinder and No. 3 Jig Borer both restrict errors in longitudinal travel to a maximum of 90 millionths in 18 inches, likewise, for the utmost in precision measuring and location. The jig

ALL NEW

MARK II
Shoplifter
$1950.00 FOB Chicago



All lifters at this price *are not* the same. Compare and note the quality of the new Mark II, which now replaces the Type D Shoplifter. Full 750 lb. capacity can be handled safely anywhere on the platform.

No-drift, full control hoist unit. Raise or lower the load to fractional positioning. Built for years of continuous service with minimum maintenance. *Complete* safety features included at no extra cost.

Applicable in small plants for "too heavy to lift loads" and in large plants to supplement powered equipment. The economical way to transfer molds and dies, unload trucks, stack in narrow aisles, or raise parts and machinery to working levels.

Write for specifications and other details.

ECONOMY ENGINEERING
4507 W. Lake St., Chicago 24, Ill.

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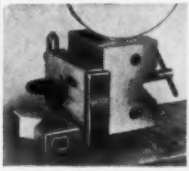
LASSY MASTER V-BLOCK

HARDENED STEEL

ANGLE PLATES



New design saves hours of setup time. Assures precise work accuracy to .0001.



Also ideal as a master for regrinding worn or inaccurate angleplates.

Write for New illustrated catalog on Time Saving Devices

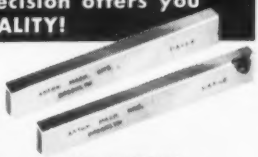
LASSY TOOL CO.

PLAINVILLE, CONNECTICUT

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ACCURACY *is an* ECONOMY!

and only precision offers you HIGHEST QUALITY!



now is the time to put your OLD STEEL PARALLELS to "LIKE NEW" conditions and to be ready for the big push.

For the first time Anton Machine Works offers to regrind your old parallels to the following tolerances:

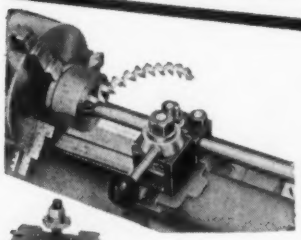
- Parallelism and straightness over length of 6" ±.0001
- Size tolerance between a pair ±.00005. A complete list of new parallels in stock will be mailed on request.

ANTON MACHINE WORKS

1226 FLUSHING AVE., BROOKLYN 37, N. Y.

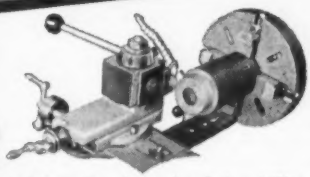
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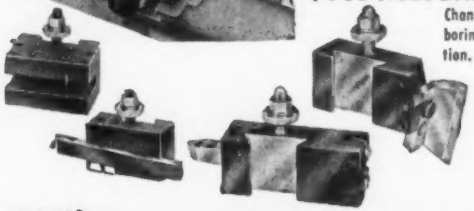
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ALORIS QUICK CHANGE

TOOL POSTS & TOOL HOLDERS





Change tools instantly—for turning, facing, drilling, boring, threading, knurling, cutting off or any operation.

- Maximum Repetitive Accuracy Assured
- No Shims . . . No Time Wasted
- Unlimited Versatility
- Saves 90% Set-up Time, 50% Production Time
- Greater Rigidity
- Leading Lathe Mfrs. Recommend It
- Sizes to Fit Every Lathe
- Unconditionally Guaranteed

NEW!



Aloris Holder for Carbide Triangular Inserts. For both positive rake and negative rake inserts. Greater rigidity, versatility, efficiency & economy

The most complete line of tool posts and holders. **Write For Catalog & Price List**

ALORIS TOOL CO., INC. 419 Getty Avenue Clifton, New Jersey

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grinder will perform with split-tenth accuracy, while the jig borer will locate, bore, drill and ream with an accuracy finer than the present limits of the tenth.

The adoption of the new International Inch will serve to eliminate the paradoxical existence of the former small, medium and long inches, as well as to enforce identical standards in the field of measurement in international intercourse and all scientific cooperation. The countries involved include United States, Canada, Great Britain, New Zealand, Australia and South Africa.

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KENCO 5 TON PRESS MAKES LONG RUN WITH 18" DIE!



Fully Supported Ram — Extra Rigidity of Kenco Frame Pay Off in Longer Die Life and Greater Die Capacity

A leading manufacturer of aluminum doors profitably employs the extra capacity of a Standard 5 ton Kenco Press to manufacture Door Guards. Fabricating the Door Guard Assembly is done in an 18" wide die ordinarily requiring a considerably larger press. Kenco's greater strength and wider frame account for this job having run for three years with only nominal die wear. Kenco's extra capacity eliminated the need to buy a heavier press.

JOB FACTS:

Machines: Two 5 ton Kenco Series 5N (standard) Presses.
Piecepart: Aluminum Tubular Door Guard Assembly.
Sequence of Operations: Press No. 1 — Flatten Tube ends. Press No. 2 — Pierce 10 holes in Tube ends and channel reinforcing, 5 per end; 18" wide die required.
Production Rate: 30 Door Guard Assemblies per hour.



Fully Guided Ram is contained in extra long V guides preventing tilting of ram. This explains why the Kenco 5 ton press does an outstanding job with an 18" wide die. Solid, heat treated steel crankshaft is free of weakening slots and offers the strongest possible construction.

NEW BULLETIN—Write for our new literature describing Kenco Press features and complete specifications. No obligation.



KENCO MANUFACTURING CO.



2 Ton | 5 Ton | 8 Ton | 15 Ton | Deep Throat | Electro-Safe | Specials | Slow Speeds

5211 Telegraph Rd., Los Angeles 22, Calif. The Most Complete Line of Small Punch Presses in the World

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HOLES



ECONOMICAL
FAST DRILLING
IN DEEP HOLES

Clark "SPADE DRILL"

P. O. BOX 990 BEVERLY HILLS, CALIF.

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MATCHED SET—12 **AWLS-PUNCHES**

For Toolmakers, Machinists, Tool Cribs.

Use as hand punch, prick, hammer punch, scratch awl, centering pin, scriber. Precision made of tool steel. Carefully heat treated. Can resharpen many times. Sizes 7/16" dia. x 6½" long to ⅛" x 3". **$4.95 set of 12**



Send check or money order for postpaid shipment

ORDER NOW!

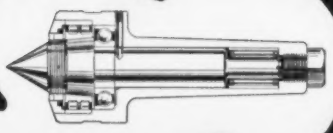
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Box 86M **Paramus, N. J.**

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Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

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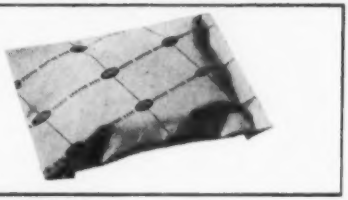
NIELSEN, INC. LAWTON, MICHIGAN

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➔ **SPEED**—Nine seconds is all it takes to pack a product for shipment. Insert item—staple or tape. It's ready to go!

➔ **PROTECTION**—Thickly cushioned, inexpensive Jiffy Bag is all the protection your product needs. It takes the place of boxes, fillers, overwraps.

➔ **ECONOMY**—You can save up to 76% packing time by switching to JIFFY BAGS. Eliminate overtime. Meet delivery schedules with money-saving, time-saving JIFFY BAGS.

Write today for samples and prices.

JIFFY MANUFACTURING CO.

377 FLORENCE AVE., HILLSIDE, N. J.

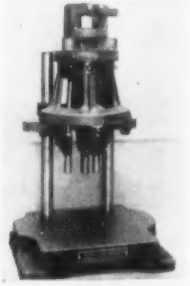
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new shop equipment . . .

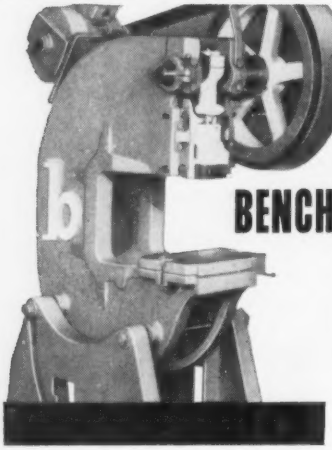
DRILLING AND TAPPING HEADS

Ettco Tool & Machine Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y., announces the Model 400 Knuckle-Head, which is a fully adjustable four spindle drilling and tapping head that meets the demand for a compact, lightweight unit to perform small delicate production operations. It is designed to operate in any position on any drill press, drilling or tapping unit or machine. It will either drill or tap from 2 to 4 holes ranging from 1/32 to ¼ inch in steel.

Spindles on this head are of the universal joint type and can be easily adjusted to almost any hole pattern within a 4 inch diameter bolt circle with a ⅝ inch minimum center distance. Specal spindles allowing a ½ inch minimum center distance are also available. Spindles are adjusted to the desired position by means of a locating arm which, like the spindle shaft, can be added or removed without tools. Where the advantages of fixed spindle operation are desired, aluminum templates, jig bored as required, can be supplied instead of adjusting arms. Guide bushings are provided in the gear case to permit the use of guide rods for maximum rigidity. Gear case



The Ettco Drilling and Tapping Head



MEASURE THIS BENCHMASTER THROAT

...the small press that does BIG press jobs!

There's no matching Benchmaster variety and versatility. For example, Benchmaster makes *17 different press models with many variations of each* . . . in stroke length, shut height and throat depth.

This 8 ton **BENCHMASTER DEEP THROAT PRESS** is typical of Benchmaster strength and ruggedness. *It punches to the center of a 24" circle,* comes in a choice of 3 shut heights: 9", 12" or 15" exclusive of bolster plate. Stroke lengths to 3".

OTHER BENCHMASTERS furnished in 2, 5, 8 and 10 ton models in Plain OBI, Back-Geared, Deep Throat, Half Press, Fixed Bed Gap Frame, and Multiple Ram models.

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prices and recommendations.

benchmaster

World's largest manufacturer of small punch presses and mills.

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PRICE + SERVICE = COST

As with any item, both factors must be considered in purchasing

Punches & Dies

SO the LEWTHWAITE CATALOG SHEETS list our large, planned stocks of interchangeable and exceptionally long wearing punches and dies—with prices—

AND include charts and instructions for figuring correct clearance allowances for both type and thickness of metal being punched —so that the best tools are used under the best conditions—

THEN leave it up to you to buy—try—and decide.

WHEN you do, we think you will join the ever-growing list of **T. H. LEWTHWAITE MACHINE CO.** customers.

Send for catalog sheets on our complete line today.

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THE FINEST STANDARD
BRIGHT and HEAT TREATED CAP SCREWS

AS WELL AS

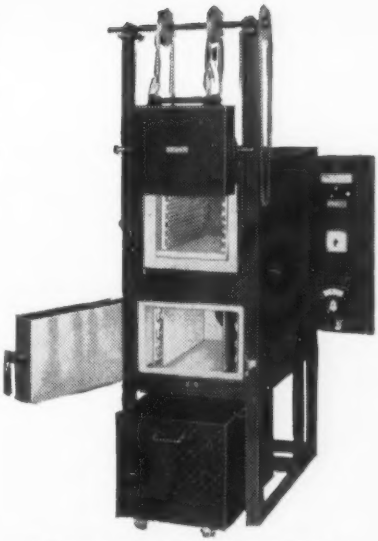
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MILLED-FROM-THE-BAR
CAP SCREWS • SET SCREWS
COUPLING BOLTS and STUDS

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Wm. H. Ottemiller Co.
YORK, PENNA.

Precision Milled Specials? Of Course! We'll be glad to quote on yours — promptly.

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SAVE SPACE WITH A
SERIES 8055
COMBINATION MODEL

The Series 8055 is two electric heat treating furnaces (Hardening 2,000° F. and 2,300° F., and Drawing 800° F. and 1,250° F.) in the floor space of one furnace. Each furnace is independently controlled permitting hardening and drawing operations to be performed at the same time. All models are delivered with separate controls for each furnace. The 8055 series is made in nine standard sizes . . . other models are made to your specifications. Furnaces operate on standard line voltage . . . no transformer necessary. A hardening and preheating combination is also available.

Write for a free catalog of the entire Lucifer line. Engineering advice is offered without obligation. Write, wire or call . . .

LUCIFER FURNACES, INC.

NESHAMINY 6, PA.

Phone: Diamond 3-0411

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of the Model 400 is of aluminum alloy construction and provides 1:1 ratio of drive to driven spindle.

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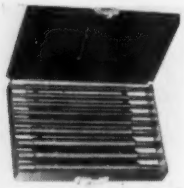
★ modern machine shop ★

TAP EXTENSIONS

A line of tap extensions (or tap holders), designed specifically for machine tapping operations, is available from The Walton Co., Hartford 10, Conn., for standard taps in sizes ranging from No. 0-80 to ½ inch-20. They are equally suitable for hand tapping work. These tap extensions, known as Style B, are made to close tolerances and carefully heat treated. The 8 inch extensions make possible either machine or hand tapping of those otherwise inaccessible. The squared shank of the tap fits into a corresponding square in the socket of the extension. The tap, supported by the close-fitting long socket of the extension, is held firmly in position by two socket set screws which bear on the square of the tap. The internal square in the extension transmits the necessary driving torque to the tap.

The extensions are packaged in a sturdy metal box as a set of nine tools. With this complete set, taps can be quickly lengthened from 8 to 28¼ inches.

For more data circle 124 on Postpaid Card



Walton Tap Extension



For more data circle 470 on Postpaid Card



Universal
"FULL-FLO"
COOLANT NOZZLES
with AERATOR
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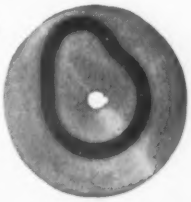


COLDPOINT DRILL
"The drill that hasn't been stopped yet"
If you have a drilling problem, we think we can solve it. We can sell you the drills or do your drilling on a contract basis.
MOSSBERG, INC.
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CINCINNATI 31, OHIO

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You need
Rowbottom for Cams

Typical Rowbottom-produced Cam.



because: . . . you get the benefit of long, specialized experience, in producing Cams and Cam-Making Machines exclusively . . . a complete service on any quantity of cams of any type . . . at prices that are *RIGHT*. Send us your inquiries.

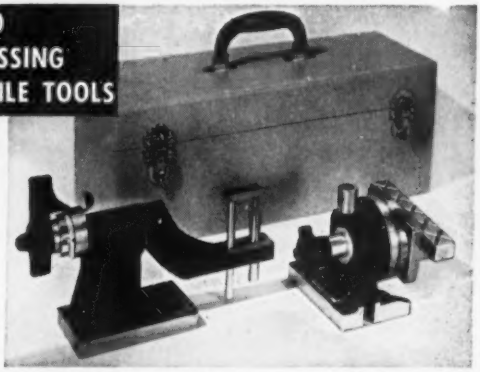
THE ROWBOTTOM MACHINE CO. • P.O. Box 4097 • Waterbury, Conn.

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Now ANGLE TANGENT TO RADIUS WHEEL DRESSING WITH NEW VERSATILE TOOLS

MIGHTY GOOD AT ANY PRICE
BUT TOPS AT ONLY $149.50
(Both tools including diamonds)

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.



Our fixtures will dress most radii and angles tangent to each other, similar to those shown below.

FREE handsome, wooden storage box. Write for complete information.

Distributorship available in select territories.

ROTH FUSS TOOL COMPANY
P. O. BOX 2693, ELMWOOD STATION PROVIDENCE 7, R. I.

For more data circle 474 on Postpaid Card

SOLUBLE GRINDING COMPOUND

The L. R. Kerns Co., 2659 East 95th St., Chicago 17, Ill., announces a dual purpose synthetic grinding and cutting compound, which is known as Kerns SGC-6560.

The manufacturer claims that it incorporates extreme pressure properties and leaves an oily film on work. Kerns SGC-6560 formulation presents excellent anti-weld qualities plus superior effective pressure characteristics that make it equally suitable for cutting operations.

It completely eliminates rancidity and will not cause skin irritation. Transparent and non-drying, this product produces clean looking work, yet provides superior rust protection and lubrication. It will not dry out on gages, ways or moving parts and will not cause binding, sticking or in any way impair operation of machines or machined parts.

For more data circle 125 on Postpaid Card

★ mms ★

TAPPING ATTACHMENT

Homestrand, Inc., 9 Addison St., Larchmont, N. Y., has added a reversing tapping attachment, the SAR-100, to its S.P.V. tapping line. Features of



Tapping Attachment

You can't beat Sanding with a

MITY-MIDGET

LIGHTWEIGHT, FAST, DEPENDABLE

Weighing only 4 pounds . . . yet so powerful you can't stall it by standing on it . . . this Air Driven, Orbital Action Sander gives a perfect finish, quickly and easily.



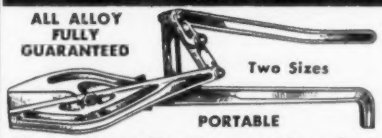
NATIONAL D DETROIT

See how "Mity-Midget" can save you time and money. Write for a complete catalog today.

NATIONAL-DETROIT, INC., ROCKFORD, ILLINOIS

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BREMIL
The IMPROVED Compound Lever Shears



No. 1 cuts up to No. 11 gauge strip or sheet.
No. 2 cuts up to ¼" steel plate.
BREMIL MFG. CO.
1020 Holland St., Erie, Pa.

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Make 3 hammers AT ONCE!

It's the NEW, easy, economical, quick way to mold your own lead hammers on a production basis with "SHUR-GRIP" handles and this COOK production mold.

COMPLETE LEAD HAMMER SERVICE

Write for circular and prices

COOK'S LEAD HAMMER SERVICE
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Wgt. 650 lbs.

PRICE $695.00

Cast Pedestal Base $95.00

¾ H.P.

BARKER Model A-M Milling Machine

A heavier Barker Mill with larger working surfaces for machining bigger parts. Takes #30MM standard adapters. Will accommodate most standard indexing heads, vises and special accessories.

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BARKER ENGINEERING CO.
500 Green Rd. Cleveland 21, Ohio

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MORE REACH *for the* Tapping Head

You can machine tap in deep holes and awkward locations with ordinary, standard taps *plus Walton's NEW "Style B" Extensions.* Single units fit together to make a rigid, closely aligned assembly, for either machine or hand tapping operations.

Adaptable to all standard taps from #0 to ½". A complete, boxed set of 9 tools lengthens taps from 8" to 28¼" Eliminates the need and cost of expensive, "long" taps.

Write for Specifications and Data Sheet #10. These new extensions will be sent for 30 days Free Trial, if requested.

WALTON TOOLS SINCE 1908
THE WALTON COMPANY HARTFORD, CONN. HARTFORD 10 CONNECTICUT

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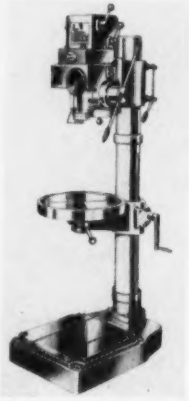
the attachment are: easily hand-adjusted torque clutch; no forces on the tap; when "over-running," clutch is disengaged; friction-free axial movement, using tap itself as leadscrew; cuts consistently perfect threads; eliminates tap breakage, operator sensitivity, lead errors and rejects.

For more data circle 126 on Postpaid Card

DRILL PRESS

A line of heavy duty drill presses, which provides a gear drive to such tools in the popular medium capacity range, is being built in Sweden for Boice-Crane Co., 937 West Central Ave., Toledo 6, Ohio. The line includes 1 and 1¼ inch capacity hand feed models in the 18 and 24 inch classes respectively, plus a power feed model in the 24 inch class. Positive, powerful all-gear drive eliminates tight belts, cumbersome pulleys and guards, maintains high torque at lower speeds to permit drilling larger holes and the use of larger multiple spindle attachments. The result is a more compact head. Numerous ball bearings and fully enclosed precision steel and fiber gears are used throughout.

For more data circle 127 on Postpaid Card

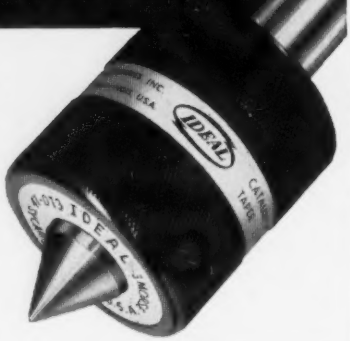


Power feed drill press

New IDEAL GOLD BAND

LIVE CENTERS

GUARANTEED TO MATCH ACCURACY AND CAPACITY OF YOUR LATHES



In the GOLD BAND line Ideal has combined the latest production methods with their traditionally fine craftsmanship to bring you an unequalled standard of excellence in live centers. Accurate, (to ± .0001") GOLD BAND Live Centers offer "custom" quality at production prices. Specify GOLD BAND Live Centers and your every need can be accommodated from stock . . . 99 times out of 100. Ideal's GOLD BAND Live Centers offer savings, simplified operations and higher lathe output both in quantity and quality. Contact your distributor today!

A COMPLETE LINE FOR EVERY NEED—SPECIALS TOO!



IDEAL INDUSTRIES, Inc.
1031-E Park Ave.
Sycamore, Illinois

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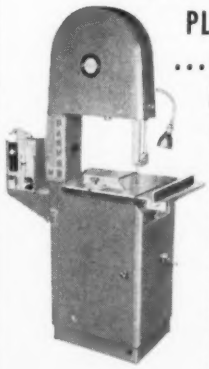
The Universal Cutting Machine

PARKS M-2 18" Band Saw

Cuts METALS - ALLOYS

PLASTICS - WOOD

... and it costs less than $500!



Here is a rugged, precision-built machine that will cut any materials you work ... at the speed best suited for that material—from 50 to 4200 F.P.M. Dual-Range, fully variable gear drive. Priced to fit any shop budget. Write for literature on band saws, wood planers, and radial saws.

The PARKS Woodworking Machine Co.

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Manufacturers of Quality Machines Since 1887

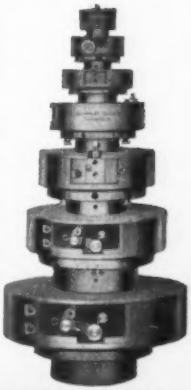
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MUMMERT-DIXON

FACINGHEADS

Two-way tool feed in 9, 12, 16, 20, 24, 30, 36, 40 and 46 sizes.

One-way tool feed in 6, 9 and 12 sizes. Automatic feed — convenient tool adjustment — quick feed reverse. Save time and costly set-ups.



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MUMMERT-DIXON CO.

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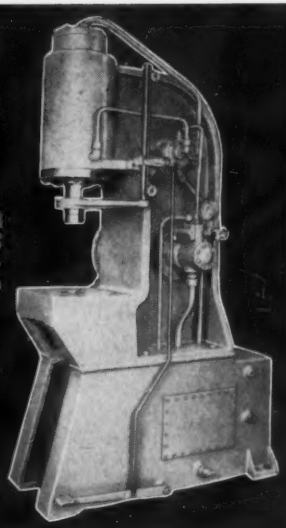
POWER

. . . when you need power!

1½-75 TONS

GREENERD, for 76 years, has manufactured Power-Performing ARBOR and HYDRAULIC PRESSES: maintenance-free: may be furnished to J.I.C. Standards, and designed to handle the following variety of work:

- ASSEMBLING
- BENDING
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Write for Catalogue #656

Greenerd ARBOR PRESS CO.

41 CROWN ST. NASHUA, N.H.

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new shop equipment . . .

REFRACTORY MATERIAL

"GRB" Silicon Carbide (silicon carbide bonded graphite), a lightweight material with unusually high thermal shock and erosion resistance characteristics, is announced by The Carborundum Co., Niagara Falls, N. Y. This super refractory material shows promise for rocket nozzles, missile leading edges, nose cones and similar applications requiring its combination of properties.

"GRB" silicon carbide is 60 to 90 weight percent silicon carbide and 10 to 40 percent solid, granular graphite. The graphite particles are surrounded and bonded by solid silicon carbide, which contributes hardness, oxidation and erosion resistance, high thermal conductivity and high decomposition temperature (4,500 degrees F. and over), while graphite particles contribute resistance to thermal shock, which is an outstanding characteristic of this silicon carbide - graphite material.

It is lightweight, 2.3 to 2.8 grams per cubic centimeter, tranverse strength 7,000 to 16,000 p.s.i. at room temperature, and 5,000 to 12,000 p.s.i. at 2,550 degrees Fahrenheit.

Various configurations can be formed using standard techniques, with sizes limited by existing furnace capacities to approximately 10 inches in diameter by 10 inches high for large diameter shapes, and 2 inches in diameter by 20 inches long for smaller shapes.

For more data circle 128 on Postpaid Card



. . . offers you SAFETY and economy of feeding and ejection

PRES-VAC SAFETY FEEDERS feed blanks to press from a safe distance of 14 inches—BY AIR!—maximum protection to operators and handling costs kept at a minimum.
Save those fingers. **$35.00**



AIR BLAST VALVES
eject parts safely with each stroke of the press—BY AIR!
Save those hands. **$29.00**

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4583

LITTELL MACHINE Co. **VAC-U-MATION DIVISION**
4163 Ravenswood Avenue, Chicago 13, Ill.
District Offices: Detroit and Cleveland

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BEVELING ATTACHMENT

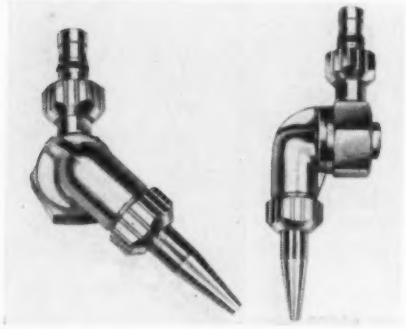
A beveling attachment, that enables a torch operator to change the cutting angle without extinguishing the flame, is announced by Smith Welding Equipment Corp., 2633 Fourth St., Southeast, Minneapolis 14, Minn. Designed principally for bevel cutting with a machine torch, the SC290 attachment is calibrated in increments of 15 to 90 degrees on each side of vertical to permit cuts at most angles. The absence of stops on the swivel member also permits reverse beveling.

Flexible seal rings imbedded in machined grooves keep the gases separated until they mix properly in the tip. They also make possible hand adjustment of the head, and prevent foreign matter from entering and causing damage to the seat.

The head of the attachment can be swiveled through its entire arc without extinguishing the preheat flame. The design also permits a change from bevel to vertical cutting and back again without a need for flame adjustment.

For straight line cutting of metal up to $\frac{3}{8}$ inch thick, the tip can be angled forward up to 30 degrees to increase speed. The SC290 simplifies manual cutting of heavy channel or I beams.

Adaptable to standard cutting machines equipped with Smith torches,



Smith SC290 Bevel Cutting Attachment



ENCO

Self-Indexing HEXTURRET

Convert your lathes for turret work this quick, easy way. ENCO HEXTURRET gives you the *accuracy*, *rigidity* and *speed* you need to step up lathe production and cut "per piece" costs. Easy as mounting your lathe tailstock. Does both normal and heavy lathe and screw machine work, drilling, counter boring, counter sinking, spot facing, reaming, turning, boring, etc. Fit all lathes 9" to 16" swing.

Mail coupon for cat. #53 and name of nearest Enco Franchise Dealer.

ENCO Mfg. Co.
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PRECISION ENCO ECONOMY

ENCO Manufacturing Co.
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Chicago 39. Dept. 159

Please send catalog #53 and full details of ENCO HEXTURRETS.

Name_____

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the unit weighs 19¼ ounces without the tip. In the vertical position, it measures 5¼ inches from the tip end to the torch.

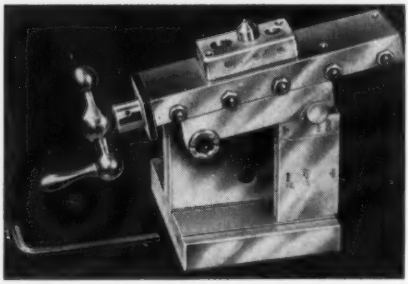
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★ modern machine shop ★

SINE DRESSER

Matco Division, Manting Tool & Die Corp., Dept. 90, Morley, Mich., announces the Matco Sine Dresser which is designed and made for use with standard gage blocks and sine table. The diamond holder block has 2 inches of travel and is moved across the grinding wheel by a smooth screw feed, actuated by a hand knob. Chatter is eliminated.

The dresser can be adjusted beyond 45 degrees, up or down, for dressing wheels to almost any desired angle.



Shown above is The Matco Sine Dresser

The split type hinge roll locks positively at any angle. The diamond holder block can be mounted in two positions and has three hole sizes to accommodate standard diamond mountings.

The ways and platen are hardened and ground, and the entire unit has precision machined surfaces. Overall height, without diamond, is 4⅞ inches.

For more data circle 130 on Postpaid Card

Commander

TAPPER

- **Wider Range . . . 1 Tapper Handles No. 0 to ¾" Taps**
- **Automatic Tap Protection**
- **Furnished to fit *any* Drill Press**

Commander — "The Tapper That Thinks For Its Operator," has the adjustable full range torque control that instantly stops any tap when it becomes dull, loaded, strikes a hard spot or bottoms in blind hole tapping. Assures maximum tap protection, higher production, even with inexperienced operators.

Your nearby Commander Distributor can give you a demonstration in your own plant. Write for his name and a copy of the NEW Commander Full Line Catalog.

COMMANDER MFG. CO.
4224 W. Kinzie St. Chicago 24, Ill.



Any operator does precision tapping with a *Commander* TAPPER

Product of *Commander* . . . Builder of the *Multi-Drill*

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INDICATOR STOP GAGE

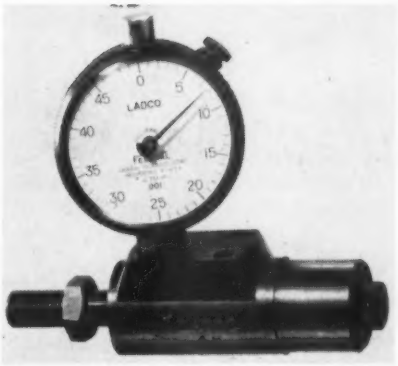
A stop gage for locating accurately the universal carriage of turret lathes, is introduced by Lad Gage Co., Box A, Geauga Lake, Ohio. The Ladco Gage makes it possible to hold very close face-to-face, face-to-neck or any dimension that requires an accurate longitudinal positioning of tooling mounted on the cross slide.

The Ladco Gage is easily and quickly installed, saving time and trouble in setup. The gage screws directly into the stop rod in place of the master stop screw. It does not in any way limit the use of all the adjustable screws in the stop spool, should they be needed.

Incorporated in this gage is a spring of approximately 300 pounds pressure which disengages the longitudinal feed of the universal carriage without actuating the dial indicator.

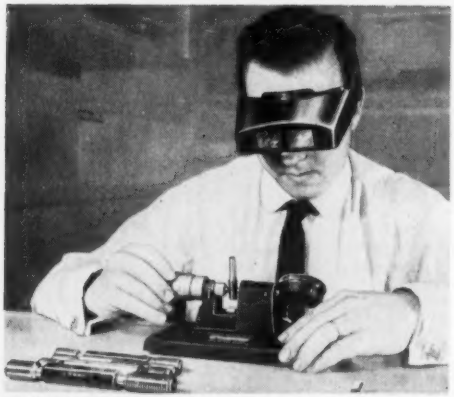
The dial indicator is protected from damage when the carriage is accidentally bumped into the stop rod, because the spring retainer comes into solid contact with the body of the gage stop at the end of the allowed travel.

The amount of travel the stop registers on the indicator is 0.035 to



Above is the Ladco Indicator Stop Gage

People work better when they SEE BETTER®



HUGHES AIRCRAFT CO. Research and Development Lab. *uses MAGNI-FOCUSER for closer visual inspection of high precision gauges.*

For increased production, greater accuracy, fewer accidents and errors, use the MAGNI-FOCUSER—the new 3-D binocular magnifier with matched prismatic lenses. It provides needle-sharp vision — *greatly magnified* and in *third dimension.*

Scores of industrial jobs are being aided by the MAGNI-FOCUSER. It reduces eye strain and avoids squinting; leaves both hands free to work. It's light weight; can be worn with or without eye glasses; normal vision resumed simply by raising the head.

Speed your production by ordering now on 10-day trial basis without obligation. Only $10.50. Immediate delivery. Or write for illustrated folder.

MAGNI-FOCUSER **the 3-D Magnifier that speeds production and leaves both hands free to work**

EDROY PRODUCTS CO., Dept. P, 480 Lexington Ave., New York 17, N. Y.

For more data circle 487 on Postpaid Card

0.045 inch and longitudinal tolerances of plus 0.0005 and minus 0.0005 inch are easily maintained.

The Ladco Stop Gage is available from the manufacturer with a choice of either regular or waterproof indicator.

For more data circle 131 on Postpaid Card

CYCLONE SEPARATOR

Largest of a newly designed series of cyclone separators, introduced by Torit Mfg. Co., Dept. 712, Walnut and Exchange Sts., St. Paul 2, Minn., is the Model 36, a cyclone which operates in the 4,000 to 6,000 plus c.f.m. range. Other models are the No. 24, operating in the 2,000-3,000 c.f.m. range and the Model 30, rated from 3,000 to 4,500 cubic feet per minute. The Model 36 features adjustable belt drive to give a wide range of c.f.m. performances against varying resistances. Its long tapering cone design and high inlet velocity place it in the high efficiency cyclone separator classification.

The blower is mounted either on the clean air side of the collector or



Torit Dust Collector

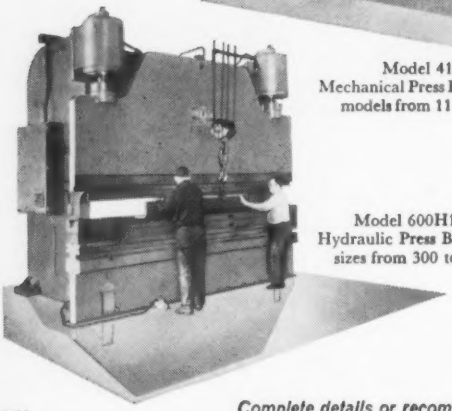
CHICAGO® PRESS BRAKES

UNEXCELLED ACCURACY

for sheet metal and plate work



Model 410D, 90-Ton CHICAGO Mechanical Press Brake. Other standard models from 11 to 450 ton capacities.



Model 600H10, 600-Ton CHICAGO Hydraulic Press Brake. Other standard sizes from 300 to 2000 ton capacities.

8460

Complete details or recommendations on any press brake work upon request

Press Brakes
Press Brake Dies
Straight-Side-Type Presses
Hand and Power Bending Brakes
Special Forming Machines

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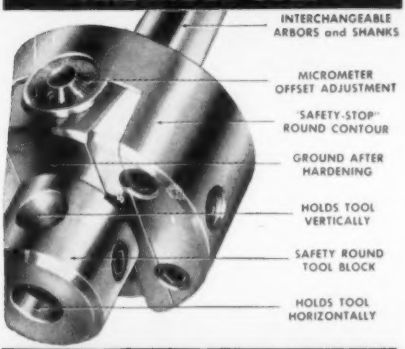


INSPECTION TOOLS made of MEEHANITE METAL — designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.
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LEADING NAME IN BORING HEADS FOR 40 YEARS
19 MODELS *Write for catalog*
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THE BEST PORTABLE ELEVATING TABLE YOU CAN BUY...

(Eliminates Cranking)



2000 LBS. OR *1000 LBS. CAPACITIES
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A precision made MIDWEST TABLE Costs no more!

- It's hydraulic . . . positions work or feeds at desired height without use of hands
- Rigid cast construction
- Top turns 360° and clamps
- Foot release valve to lower
- Machined top surface can be used as work table.
- Roller bearing casters with ball bearing swivels
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Write today . . . specials on request

MIDWEST TOOL & ENGINEERING COMPANY
114 WEBSTER ST. • DAYTON 2, OHIO

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remotely to prevent fan damage from bulky dust, chips, wood blocks, tramp iron or other foreign substances. These are deposited in the collector base, before air reaches the blower. If the blower is located remotely, it can be used for either blow-through or pull-through operations.

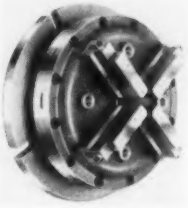
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DIAPHRAGM CHUCK

A line of air operated diaphragm chucks is announced by Erickson Tool Co., 34455-2 Solon Rd., Solon, Ohio. Three basic models are offered. They are designated as Model 5½ with capacity of ⅛ to 3 inches in diameter, Model 7 with capacity of ½ to 4¼ inches in diameter and Model 10 having a capacity of 1 to 6½ inches in diameter. Piston areas are, respectively, 13.80, 24.74 and 49.68 square inches. These chucks are precision holding devices for utmost accuracy and concentricity. The manufacturer states that the design gives the greatest rigidity to the jaws and also eliminates air leakage.

The work part can be chucked either internally or externally. Quick change diaphragm replacement, interchangeable jaws and sludge slots in the periphery are also featured.

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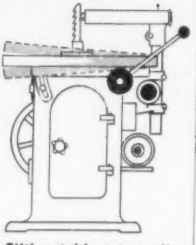


Erickson Air Operated Diaphragm Chuck



WITH **DAVIS** KEYSEATERS!

You can cut accurate, low-cost internal keyways at *minimum* cost with Davis Keyseaters. Here's why: (1) operation is designed for production *speed;* (2) machine sets up easily, does *not* require skilled operator; (3) maximum concentricity of the keyway in each bore assured; (4) Built in 2 sizes. Keyways range from $\frac{1}{16}$" to 1". High speed steel cutters stocked in all sizes; (5) the *best* keyseater of its type, yet *inexpensive!* Write now for FREE DETAILED LITERATURE!



Tilting table sets easily for tapered keyways up to 3" per foot.

DAVIS KEYSEATER COMPANY

DIVISION OF *Hansford* MANUFACTURING CORPORATION

1239M University Ave., Rochester 7, New York

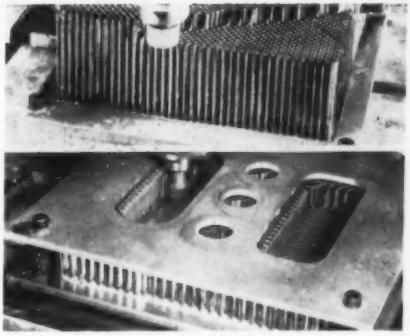
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PROCESS FOR CONTOUR MACHINING OF STAINLESS STEEL HONEYCOMB

Machining of stainless steel honeycomb for aircraft and missile construction presents a problem in that the material is difficult to machine by conventional methods. Close tolerances must be held and the honeycomb edge must be clean and free of burrs so that the outer skin can be properly brazed to it. Machining temperatures too, must be kept low so that no metallurgical changes take place.

Through an application developed by Ekstrom, Carlson & Co., 1400 Railroad Ave., Rockford, Ill., of this electrolytic machining process, it is possible to machine complex contours and configurations. This is important to the aircraft and missiles industries.

Almost any shape, profile or contour that can be machined on solid metal can be duplicated on honeycomb, as well. Recesses or cavities, long, narrow, oval or round can be machined into the honeycomb with very close tolerances.



(Upper) Diagonal cut on stainless steel honeycomb. (Lower) Same setup is shown using overlay template for cavity machining

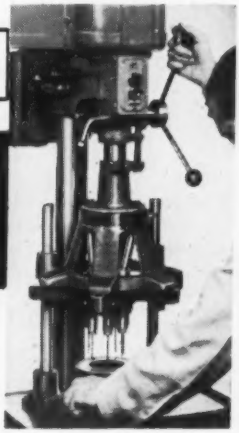
Involute curves, diagonals and even spiral cuts are machined easily and quickly using a modified tracer method in conjunction with the control mechanism. The results: close tolerances are

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K nuckle-heads

fully adjustable for dependable multi-hole drilling and tapping

5 models to choose from — circle or straight line types



- Chrome nickel universal ball joint type spindles.
- Adapt to any drill press or drilling or tapping unit or machine — Operate in any position.
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- Tap or drill capacities up to 5/8" in steel.
- Precision built, lightweight and compact.

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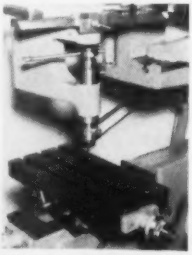
held, free from burrs or metal layover; skin brazing operation is simplified, bond is perfect; operation is speeded up; no heat is generated to cause metallurgical alterations; there are no heat checks or grinding cracks; and surfaces are stress free.

For more data circle 134 on Postpaid Card

DRILL ATTACHMENT

H. P. Preis Engraving Machine Co., 249 Industrial Branch, U. S. Highway 22, Hillside, N. J., announces a quick-action drill attachment for its Model 2D-4 Panto Engraver. This attachment enables the operator to drill any number of holes from an accurate master template. The extension drop lever provides for a maximum vertical spindle travel of 15/32 inch with a positive stop for depth control. Two precision drill chucks are available to hold drills from 0.008 to 0.0625 inch in diameter or from 0.025 to 0.125 inch in diameter, in addition to the standard split collets.

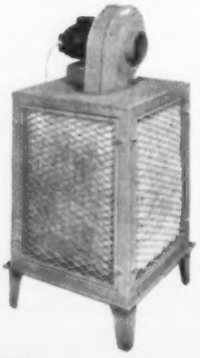
With a choice of six cutter spindle speeds ranging from 5,000 to 14,000 r.p.m. and with pantograph reduction ratios from 1:1 to infinity, the Preis Panto Engraver 2D-4 with drill attachment is particularly useful for drilling printed circuit units used exten-



Preis Quick-Action Drill Attachment

TORIT Mist Collectors *CONTROL* wet machining MIST

Wet machining operations produce floating fog and mist that could pollute the air in your plant. With the new Torit Mist Collector your men can breathe clean air and work in a safe, dry plant—while your maintenance costs go down! The new Torit Mist Collector filters out moisture through its spun glass filters—saves coolant that can be piped back into your cooling system. For full facts write today to . . . TORIT MANUFACTURING CO.
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St. Paul 2, Minn. • Dept. 712



THE NEW

TORIT MIST COLLECTOR

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sively in electrical and electronic products and for drilling, engraving and profiling in carbon, plastic and metal plates.

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ARBOR SPACERS

Adjustable micrometer arbor spacers are announced by Mayer Eng. & Mfg. Co., 815 South Ninth St., Milwaukee 4, Wisconsin.

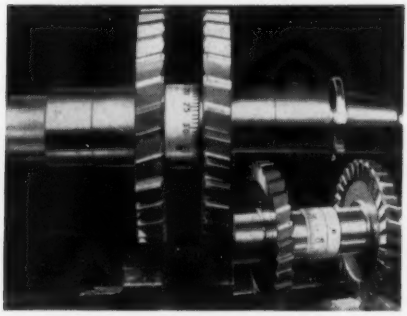
These precise adjusting spacers are used primarily for straddle milling. Other applications are raising blocks, fixture spacers, gage sets and stops for milling machines, lathes, drill presses, turret lathes and die jacks.

These arbor spacers each have one thousandth graduations. They make it unnecessary to use shim stock and/or paper as a means of spacing.

Spacers are available in $\frac{3}{8}$ to $1\frac{1}{2}$ inch widths and larger sizes up to 5 inches can be made on order. Special sizes can be made to specifications.

The narrow sizes have 1/16 inch adjustment and the wider sizes have up to $\frac{1}{4}$ inch adjustment. One revolution equals 1/16 inch. Spacers have a keyway slot. Those with widths $\frac{3}{8}$ to 1 inch are a non-locking type, widths $1\frac{1}{2}$ inches and up are a locking type.

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1 inch non-locking arbor spacer. Inset shows 1½ inch locking arbor spacer.

True Conical Grinding on a STERLING Drill Grinder gives you Faster Cutting Drills and More Holes per grind

Conical grinding of a drill point produces the same clearance angle from O.D. to web. The drill enters the work easier, cuts a uniform chip that requires less pressure, less power.

STERLING "DV"

$550.00

F.O.B. Eau Claire, Wis.



CAPACITY

90°—140° Included angle, variable clearance angle set with built-in gage. Grinds ⅛" to 2½" drills; 2, 3 & 4 flutes.

Set-up is simple and fast because no chucks or collets are used. Built-in diamond wheel dresser produces a finished cutting edge that stands up longer. You get more, accurate holes with drills ground on a STERLING "DV".

Ask your STERLING Dealer for complete information on all STERLING Drill Grinders and STERLING Tool and Cutter Grinders or write direct

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INCREASE
IN STOCK REMOVAL RATE



GRIND AND LAP at the same time. Get lapping accuracy at grinding prices. Obtain finishes of 1 RMS; flatness and parallelism to 2 millionths of an inch . . . with metals, plastics and ceramics.

SPEEDLAP is a "lap-grinding" unit which uses a non-chargeable lap plate, also higher lapping pressures, to give greater and faster penetration.

Ask for cost and production estimates based on samples of your work. Job lapping services also available.

ABRADING SYSTEMS COMPANY
8020 NORTH MONTICELLO AVENUE
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new shop equipment . . .

SPINDLE FINISHING MACHINES

Five spindle type finishing machines, designed to give continuous in-line producton of precision finished parts, are announced by Almco, Queen Products Division, King-Seeley Corp., Albert Lea, Minnesota.

These machines enable precision finishing of complex high quality components such as gears, bearing cages, spline shafts, pump rotors and jet blades at fast, continuous production rates. In most cases, 0.005 to 0.015 radii can be generated on hardened gear teeth contours in from two to four minutes, while surface r.m.s. is greatly improved. Important to note, all surfaces of the part get the same amount of precision finishing.

The five Almco Spindle Finishing Machines are designed to cover a wide range of product finishing requirements. Model designations are as follows: Model 2SF (2 spindles) and Model 4SF (4 spindles), have non-indexing heads; and Model 4SA (4 spin-



Almco Model 8SA Spindle Finishing Machine

dles), Model 8SA (8 spindles) and Model 16SA (9 to 16 spindles) all have automatic indexing heads. Tub diameter is 48 inches for the 2 and 4 spindle machines, 58 inches for the 8 spindle machine and 90 inches for the 9 to 16 spindle models. All models can accommodate approximately an 18 inch depth of media.

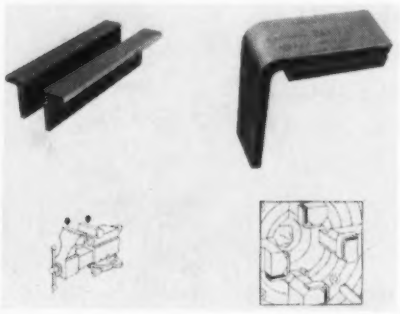
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PADS TO PROTECT STOCK

Miller Pattern & Mfg. Co., 3320 Bay Rd., Saginaw, Mich., announces Magnapads, for use on vise and lathe chuck jaws to eliminate marring of stock. Magnapads are made of soft metal that conforms to the contour of the stock, gripping it fast without marring. Magnapads are held in place on the jaws by General Electric alnico magnets. They will replace unhandy makeshift devices, such as blocks of wood, to prevent marring by the jaws. Setup requires no extra help, and is quick and easy because the magnets hold to the exact position desired on the metal surface of the lathe or vise.

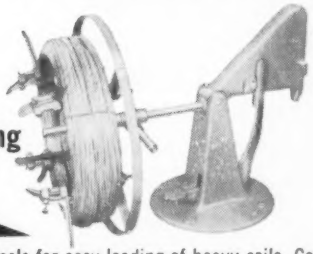
Magnapads are available in sizes for use on vises from 3 to 5 inches wide in lead, aluminum, soft or hard brass. Magnapads for lathe chuck jaws are



Magnapad for vise and lathe chuck jaws

For REEL Efficiency... NILSON WIRE and RIBBON STOCK REELS

3 TYPES—8 MODELS

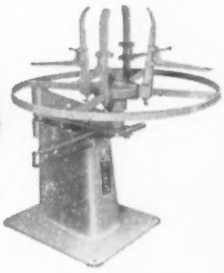


3 Tilting Reels

Portable reels for easy loading of heavy coils. Coil Capacity: 150, 225 and 525 lbs., respectively.

2 Clutch Reels

Oscillating motion eliminates slippage of stock. Coil Capacity: 175 and 250 lbs., respectively.





3 Stationary Base Reels

Economical reels for general-purpose production. Coil Capacity: 75, 150 & 225 lbs., respectively.

In addition to these standard models, we can build variations to meet special requirements. Write today for your copy of the Nilson Catalog on Wire and Ribbon Metal Stock Reels!

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For drilling, tapping, milling, sawing, grinding, etc. Removes heat from cutting edges of tools and work. Feeds can be increased considerably, finer finishes and accuracy are obtained. TRICO-MIST absorbs heat, thereby quenching it faster than flood coolants which only transfer it. Chips slide freely up the tool face and are blown away automatically. Simple needle valve controls size and volume of mist spray. Attaches to shop air line. Available with one and five gallon containers—single or multiple outlets—single or dual valve control.

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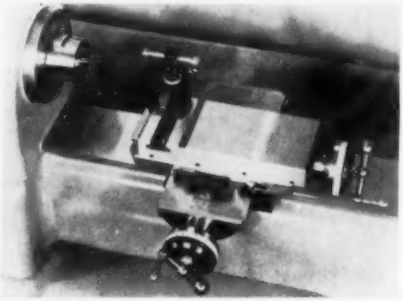
TRICO FUSE MFG. CO.
MILWAUKEE, WIS. U.S.A.

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obtainable in soft copper with attached magnets in 45 and 90 degree shapes.
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COMPOUND SLIDE REST

A compound slide rest is available from Hardinge Brothers, Inc., Elmira, N. Y., for all of its precision lathes. The new model slide rest is equipped with a rugged square body tool post taking standard ⅜ inch square high speed steel or carbide tool bits. The new tool post has an integral screw feed wedge type arrangement for holding the tool bit and is fast, accurate, rigid and ideally suited for use with carbide tools. Among the many advantages of the unit are magnified settings for precise angular adjustment of the index slide. Fast, easy reading black and white feed screw dials make working to close tolerances easy. Completely covered feed screws provide full protection against chips. The top slide is hardened and ground steel for maximum strength and durability. The slide rest features a quick acting safety interlock for bed positioning and double lock arrangement for index slide.
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Hardinge Brothers Compound Slide Rest

GUN DRILLING MACHINE

Secondary drilling, boring, reaming and honing operations are eliminated with a standard Boremation "Gun Bore" Gun Drilling Machine, announced by Drillmation Co., Inc., 6500 East Eleven Mile Rd., Center Line, Mich.

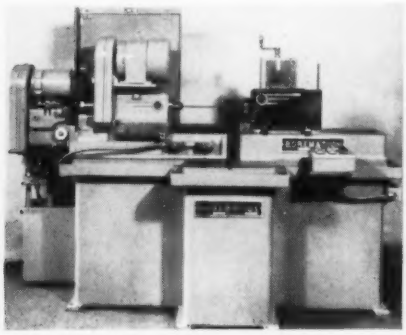
The built-in precision and workmanship of the Boremation Feed Unit assures the minimum of vibration. The resulting rigidity provides long tool life and excellent hole finish. A high degree of accuracy in hole alignment is also achieved as the result of maximum rigidity. Consequently, accuracy and finish achieved in most applications are sufficiently high to eliminate further work in holes.

Feed range is infinitely adjustable and extends from ½ to 30 i.p.m. Spindle speeds range from 100 to 10,000 revolutions per minute.

Boremation Machines are available in two standard sizes—12 inch stroke (Model 1200) and 24 inch stroke (Model 2400). Both sizes are designed, built and tested to maintain tolerances as close as tenths of thousandths of an inch in deep hole drilling.

Boremation is equally adaptable for high production cycle, short hole drilling, maintaining the desired hole tolerances in one pass.

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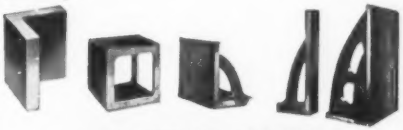
Boremation "Gun Bore" Gun Drilling Machine

Satisfied?



that it's PARALLEL?
. . . STRAIGHT?
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You will be if you use "Milwaukee" Precision Equipment—Surface Plates, Straight Edges, Angles, Box Parallels. Standard of the industry!



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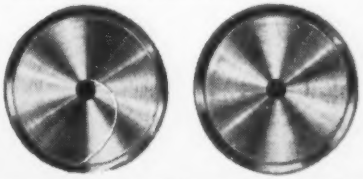
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Troubled by Withdrawal Marks?

the new RELIEVOMATIC*
saves you costly refinishing!

No more rejects or refinishing because of marred surfaces made by cutting tools on their return pass! Now—the RELIEVOMATIC renders precise parts with perfectly smooth surfaces. For boring, turning or facing on automatic metal turning equipment.

Write for complete technical literature.



normal marred surface | perfectly clear surface with RELIEVOMATIC!

* U. S. Patent No. 2,712,767

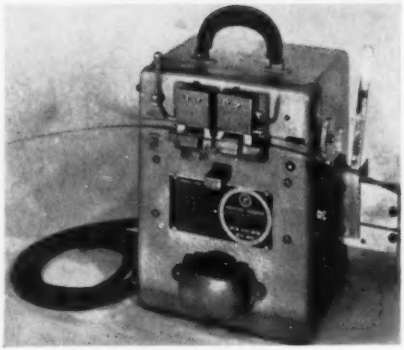
SILBER PRODUCTS, INC.
870 ESSEX STREET • BROOKLYN 8, N. Y.
Nlghtingale 9-8600

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new shop equipment . . .

BAND SAW BLADE WELDER

An improved band saw welder, which welds up to ¾ inch blade widths, is introduced by the Walker-Turner Division and Delta Power Tool Division, Rockwell Mfg. Co., 606B North Lexington Ave., Pittsburgh 8, Pa. The revised Rockwell model features a factory set flash adjustment and an improved jaw clamping adjustment, tension adjustment and a blade width indicator.



The Rockwell Band Saw Blade Welder

Designed for manufacturing operations that require large quantities of band saw blades, the welder will cut and weld any length blade. Using coil stock and the welder, the manufacturer can greatly cut his band saw blade costs.

The welder also features a blade shear and a grinding wheel for removing flash.

Mounting brackets, so that the welder can be directly mounted to Delta and Walker-Turner band saws, are available.

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Precision Tapping

by hand or machine with

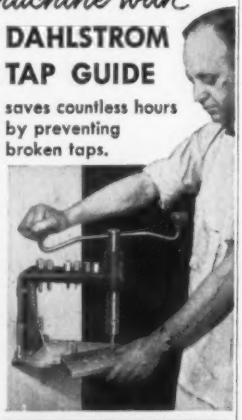
DAHLSTROM TAP GUIDE

saves countless hours by preventing broken taps.

A low-cost Dahlstrom Tap Guide provides the accuracy and close tolerances of large, expensive machines. Tap breakage, is virtually eliminated because material is always held straight and square. Light enough for portability, yet it can be bolted permanently to wall or post.

Machine Tapping

The spindle top is center-bored to fit the tail stock of a lathe. Simply pull out for lathe use. Same spindle can be used as a tap extension for reaching difficult places. Furnished with 9 adaptor sizes: 8-32; 10-24; ¼", 5/16", ⅜", 7/16", ½", 9/16", and ¾". *Write for bulletin.*



$59.50 F. O. B. FACTORY

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15 Olson Drive,
North Branch Minn.

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Air-O-chek

The Nozzle Valve with the internal fulcrum lever

Available in two models and many sizes



30 Years 1929-1959 AIR-WAY

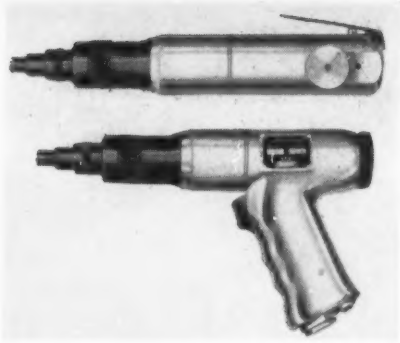
AIR ECONOMY

SAVE through superior performance, low maintenance, low initial cost. Air-O-chek air guns are of simple design, sturdy construction, and are easy to use.

Write for details

AIR-WAY PUMP & EQUIPMENT CO.
1046 N. Kilbourn Ave., Chicago 51, Ill.

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Airetool Reversible Pneumatic Screwdrivers

PNEUMATIC SCREWDRIVERS

Airetool Mfg. Co., Springfield, Ohio, has developed a series of four pneumatic screwdrivers.

The Airetool Model 400-S Non-Reversible Pneumatic Screwdriver is a straight type with a lever throttle. Its design permits using the tool in cramped quarters and it is particularly suitable for applications where the tool is suspended above the work.

The Model 400-SP is a non-reversible screwdriver with a pistol type trigger throttle, which allows the operator to use the tool continuously without fatigue.

The Model 400-RS Reversible Pneumatic Screwdriver is a straight type with lever throttle and its two direction operation makes it exceptionally versatile. A lightweight, yet rugged, tool, it can be operated all day without overheating or danger of damage to moving parts. The powerful air motor delivers plenty of drive at the recommended working air pressure of 90-100 p.s.i. The straight design of this tool makes it easy to use even where space is limited.

Fourth model in the group is the 400-RSP Reversible Pneumatic Screwdriver, which is a pistol type tool with



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a trigger throttle. A precision built tool, it can take a lot of abuse without loss of efficiency.

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SURFACE PLATE CALIBRATION

Shop calibration of surface plates to 0.00001 inch with an improved Planekator, is announced by Rahn Granite Surface Plate Co., 636 North Western Ave., Dayton 7, Ohio. The illustration shows the Planekator being used with the Ames Porta-Check, on a newly designed base, to calibrate a 24 by 36 inch surface plate. An Auto-Collimator was used to calibrate the straight edge of the Planekator to 0.00001 inch in the Rahn Gage Laboratory. Now, through the use of 10 millionths electronic instruments, laboratory accuracy can be reproduced in the shop under ordinary conditions. A good tool inspector, using the Rahn Planekator, can calibrate a surface plate with greater accuracy and in a fraction of the time required for lab-



Rahn Planekator being used with Ames Porta-Check to calibrate a surface plate

TIME SAVERS for the Tool Room

. . . and the production line

Do It Faster With A DREMEL MOTO-TOOL

DREMEL ELECTRIC MOTO-TOOLS

For top-speed, top-precision grinding, polishing, and burring, low-cost Dremel Moto-Tools are your best practical buy. Use them in tool and die work, pattern making, burring operations, and dozens of other applications. They're light and easy to handle. Give you quick access to areas inaccessible for larger grinders. Cool-running universal motor develops 27,000 RPM. Smooth operation permits precision accuracy in close-tolerance work, eliminating costly and painstaking hand work.

Model No. 2 Moto-Tool only.....$19.95

Model No. 2 Moto-Tool Kit, with 23 accessories, including high-speed cutters, in handy storage case $27.50

See Your Industrial Supply Dealer or Write to

DREMEL MANUFACTURING CO., Dept. 229E, Racine, Wis.

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oratory instruments. Gage bases are available for use with all other makes of 0.00001 inch electronic and air gage pickups, or cartridges; they are also available for all 0.0001 and 0.00005 inch indicators.

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TOOL STEEL

Particularly suitable for use in plants and small shops which do not have complete hardening facilities, Industrial Products Division, Brown and Sharpe Mfg. Co., Providence 1, R. I., announces "Ready Mark" Air Hardening Precision Ground Tool Steel, which is precolored maroon to eliminate costly cleaning, coloring and drying time required for marking ordinary flat stock.

This unique stock is rust resistant, requires no greasing or degreasing, is

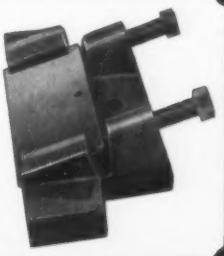


"Ready Mark" Precision Ground Tool Steel

permanently identified by its color and is available at no increase in cost over plain precision ground flat stock. Precoloring provides a high degree of clarity in layout, as well as immediate usability, and color does not affect its heat treatment.

Available in nearly 250 sizes from ⅛ by 1 inch in 18 inch lengths, "Ready Mark" is especially satisfactory for

QUICK SURE GRIP...
FOR ANY WORK ON ANY MACHINE TABLE
HART DIVIDED MACHINE VISE JAWS
Write for circular
WALTER W. FIELD & SON, INC.
39-51 HAYWARD STREET, CAMBRIDGE 42, MASS.



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dies, gages, machine parts, shear blades, knurling tools, taps and similar applications. Steel has outstanding freedom from hardening distortion and will not shrink or crack through thin sections when cooled in still air from quenching temperatures.

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TAP BUSHINGS

Drives all standard taps from No. 0 to 1⅝" and pipe taps from ⅛" to 1". Five o.d. sizes.

LESS TAP BREAKAGE

LESS TAP WEAR

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BYCO INDUSTRIES

2200 SNELLING AVE., MINNEAPOLIS, MINN.

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SHARP NAMEPLATE MARKING



Model No. 4

The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

NAMEPLATE DETAIL PRESS.

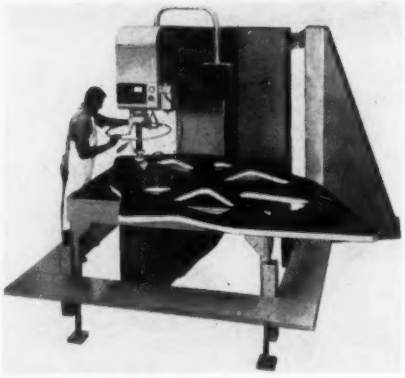
- Simple Operation
- Perfect Alignment
- Uniform Depth

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The DoAll Pan-Arm Model 5 Band Machine

BAND MACHINE

The DoAll Co., Des Plaines, Ill., announces an articulated band machine, the Pan-Arm Model 5. The great capacity of this machine for large or ungainly work is obtained by moving the cutting tool instead of the work. A sweeping head, double hinge and link construction provides over 99 square feet of unlimited cutting area, and continuous straight-cut length of 17½ feet. The Pan-Arm Model 5 shapes and forms large parts rapidly and economically. These can be machined from the solid more quickly than procuring rough castings or forgings, providing better quality at less expense.

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"Jorgensen" and "Pony" **CLAMPS**



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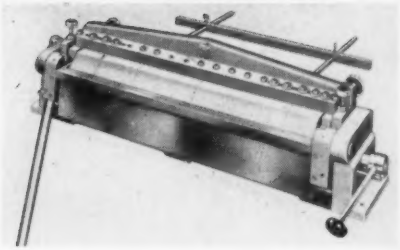
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the clamp folks

ADJUSTABLE CLAMP CO.

436 N. Ashland, Chicago 22, Ill.

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View of the Berkroy Box and Pan Brake

QUALITY PRODUCTION TOOLS

Berkroy Products Co., 1171 East 32nd St., Los Angeles 11, Calif., announces its expanded line of quality metalworking and production tools for schools and industry.

The present line includes a completely new line of box and pan brakes, slip rolls and high speed hack saws.

The box and pan brakes are available in 24, 30 and 36 inch widths. The fingers are relieved and the 30 and 36 inch widths are made of fabricated steel construction for greater strength and accuracy of bends.

The line of slip rolls in 18, 24, 30 and 36 inch widths has heavy 2 inch rollers and many other features.

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HAND OPERATED SURFACE GRINDER

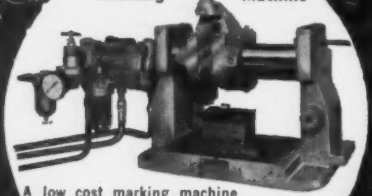
Hermes Machine Tool Co., Inc., 48-15 Northern Blvd., Long Island City 1, N. Y., announces that the Blohm High Precision Hydraulic Surface Grinder, the hand operated Model 816, is now available. It features high precision ball bearing assemblies running in hardened, ground and lapped replaceable steel ways for the longitudinal and cross movements of table and carriage; a 2 h.p. motorized, precision balanced ball bearing spindle; and a table cross feed by ratchet lever with



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Model 9 Pneumatic Marking Machine



A low cost marking machine powered by your regular air line 75 psi. and over. It marks parts, tools, sleeves, etc. of steel and also marks plastic with slight additional assembly. Write for Catalog No. 9

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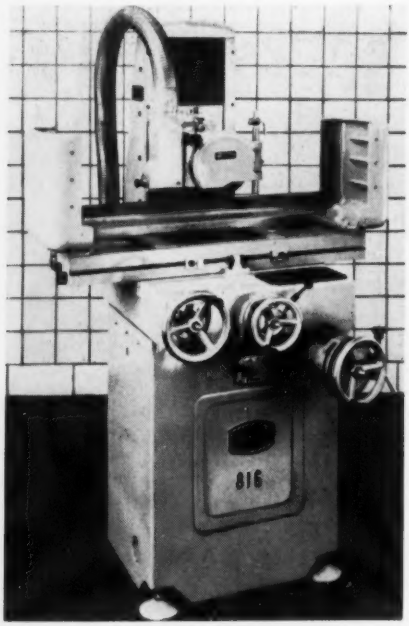
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Blohm Model 816 Surface Grinding Machine

travel adjustment for easy and uniform cross movement. This machine also offers a fine feed screw on the head elevating wheel, with readings of 0.00004 inch. Capacities are 8 by 16 inch table surface and 16 inches under the spindle.

For more data circle 147 on Postpaid Card

★ modern machine shop ★

TOOLHOLDERS

A line of Lift-O-Matic Tracer Toolholders to fit nearly all tracer lathes is announced by the Metallurgical Products Department, General Electric Co., Detroit 32, Michigan.

The toolholders use a specially designed elongated 55 degree diamond



Carboloy Lift-O-Matic Tracer Toolholder

disposable insert that resists pullout even when facing or machining a shoulder. The insert has flat parallel sides which fit snugly in the holder insert pocket. A larger insert surface area provides for more solid clamping action and better dissipation of cutting heat.

Lift-O-Matic Toolholders are available in a complete selection of sizes and styles, both positive and negative rake and right and left hand. Parts inventories can be greatly reduced because of the high degree of interchangeability of the parts.

Close tolerance indexing allows switching to a new cutting edge without repositioning the tool. The in-stock precision ground inserts can be supplied in negative or positive rakes in Carboloy Grades 883, 78B, 350 and 370 to cover practically all machining requirements.

For more data circle 148 on Postpaid Card

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LUBRICATING CONTROL UNITS

Two compact Lubro-Control Units are announced by C. A. Norgren Co., Englewood, Colo. The smaller for ⅛ inch pipe installations measures only 4½ inches wide, 4¾ inches high and 3 inches deep. A slightly larger unit for ¼ inch pipe installation measures



Airetool Midget Die Grinders finish intricate work perfectly

Airetool die grinders are lightweight and power-packed. Yet there's no vibration. Operators easily maneuver these tools with complete accuracy. The reason is Airetool's precision-made, 3-blade air motor that delivers power smoothly. Airetool makes 3 models of midget die grinders for all types of work . . . 19,000, 38,800 and 60,000 rpm operating speeds. For complete details, write for Bulletin 67. Airetool Manufacturing Co., Springfield, Ohio.



Airetool offers a complete line of midget carbide mills: cylindrical, cylindrical rounded, ball, tapered, inverted cone, pear, egg, tree and rounded tree shapes. Write for Bulletin 63.



30 years experience in pneumatic tools
BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge
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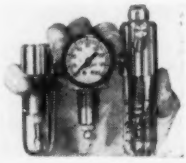
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7¼ inches wide, 5½ inches high and 3¾ inches deep.

These units provide complete and efficient processing of compressed air for service to air cylinders, air chucks, air tools, bearings and other machine components. Models are available for air flows from 0.05 to 20 cubic feet per minute. Each Lubro-Control Unit consists of an air filter, a pressure regulator and a Micro-Fog lubricator. The air filters provide efficient removal of corrosive liquids and abrasive solids from the air stream, preventing damage to connected air equipment. They feature a transparent reservoir, directional air inlet, quiet zone, sintered metal filter element and no tools required for servicing. The regulator provides reliable regulation of air pressure and is adjustable over a pressure range of 5 to 100 pounds per square inch.

The lubricators provide efficient and adjustable air-borne lubrication. They feature controlled oil delivery, transparent oil reservoir and oil feed dome for 360 degree visibility of oil feed rate, no tools required for servicing. Maximum line pressure is 150 p.s.i.; maximum regulated pressure 100 p.s.i.; maximum operating temperature is 120 degrees F.

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Lubro-Control Units



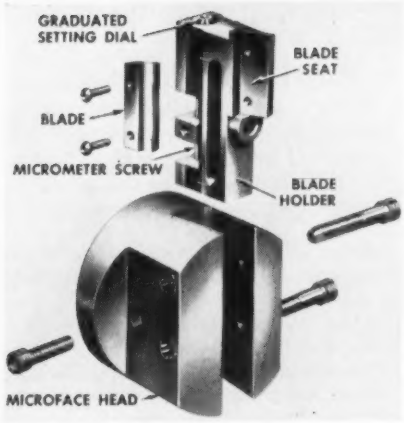
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DeVlieg Adjustable Blade Facing Head

ADJUSTABLE BLADE FACING HEAD

An adjustable blade facing head, for precision plunge facing of wide surfaces, is announced by DeVlieg Microbore Division, DeVlieg Machine Co., Fair St., Royal Oak, Mich. Known as Microface, it eliminates the need for special tooling to bore, face or spotface wide surfaces.

It employs a solid one piece head, which assures maximum rigidity and extends tool life. A minimum of down time is accomplished because interchangeable high speed steel or carbide blades may be replaced right on the machine.

The dovetail principle of mounting is said to maintain consistently accurate positioning of the blade holder throughout its range of adjustment in order that the cutting edge of the blade remains square to the center line at all times.

Microface is available in a range of sizes to machine diameters from 1½ to 8½ inch sizes. It is ideal for boring machines, turret lathes and heavy drilling equipment.

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Give You Maximum Utility—at Low Cost



The improved Linley Jig Borers are more efficient than ever. Accurate and fast in operation — easy to set up. Made for the exacting requirements of small part precision work. Using Linley Jig Borers allows larger capacity borers to be used where intended, on heavier jobs. Once you've installed a Linley, you'll wonder how you got along without it in your shop.

Table Size: 7" x 17½"
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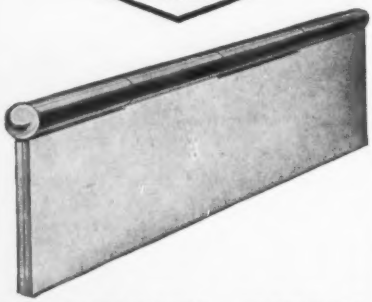
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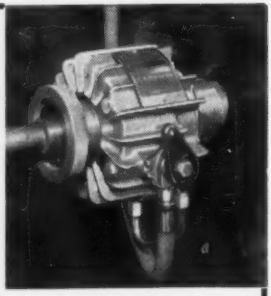
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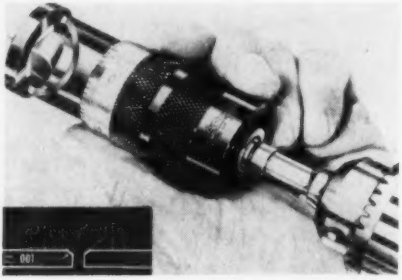
MICRO-STOP COUNTERSINK

When precise depth of cut within fixed limits of plus or minus 0.001 inch is required for countersinking, deburring, chamfering, trepanning or removing collars from Hi-Shear rivets, Schrillo Aero Tool Eng. Co., 8715 Melrose Ave., Los Angeles 46, Calif., recommends its improved Micro-Stop Countersink.

Made to the most exacting specifications, particularly for aircraft and other precision requirements, its controlled accuracy prevents costly production losses from over or under cutting. Powered by hand drill, drill press, lathe or wherever chucking is available, it may be used continuously without excessive heating.

Instant fingertip adjustment to increments of 0.001 inch is made, without use of tools, by retracting and rotating the spring loaded thimble to any desired position. The vernier scale is clearly marked for easy, accurate reading. Machine cut serrations provide positive locking and prevent accidental variation in depth of cut. Preloaded movement of the shaft assures accurate alignment and location.

The Schrillo Micro-Stop Countersink features hardened, cylindrically ground steel alloy shaft operating within an extra long, self lubricating,



Schrillo Improved Micro-Stop Countersink

friction resistant bearing. A self-contained knockout pin allows instant removal of tapered shank cutters. Glass-smooth shields protect workpiece against scratches or marring.

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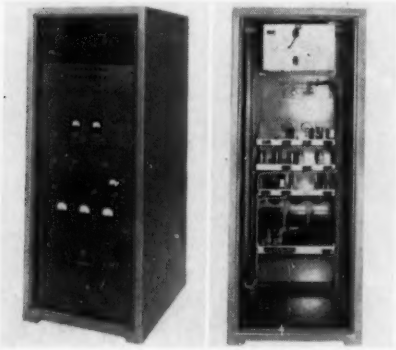
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TRACER CONTROL ATTACHMENT

Conversion of vertical turret lathes for contour turning within extremely close tolerances can be accomplished with the electronic-hydraulic Duplimatic tracer control attachments produced by Tracer Control Co., 595 East Ten Mile Rd., Hazel Park, Michigan.

Hemispherical or irregularly shaped surfaces can be contoured fully automatically both inside and out. High response Pegasus servo valves are mounted directly to Vickers piston motors. The tight position loop thus provided, complemented with tachometer feed back directly from the hydraulic motor shaft permit tolerances of plus or minus 0.005 at 25 i.p.m. and plus or minus 0.0005 at speeds to 5 i.p.m. The vertical turret lathe, to which the Duplimatic is attached, must be capable of maintaining these tolerances.

The tracer unit does not interfere with conventional operation of the



Tracer control attachment for lathes

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Universal Joint Type Drillhead . . . Full Ball or Bronze Bearing Construction, Standard or Heavy Duty. From ½" minimum centers up. Capacities to ½" in Steel.



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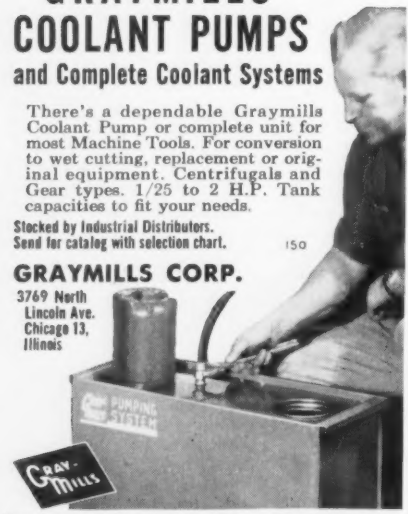
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GRAYMILLS
COOLANT PUMPS
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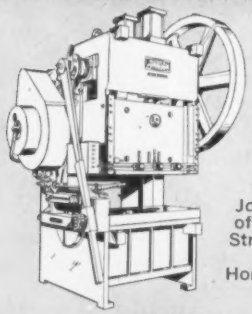
There's a dependable Graymills Coolant Pump or complete unit for most Machine Tools. For conversion to wet cutting, replacement or original equipment. Centrifugals and Gear types. 1/25 to 2 H.P. Tank capacities to fit your needs.

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machine tool. The hydraulic motor drive units disengage by means of magnetic clutches with the start and stop button. Each of the electronic components are of modular construction, and can be readily removed for servicing. All mounting brackets and field supervision of installation are located with the attachment.

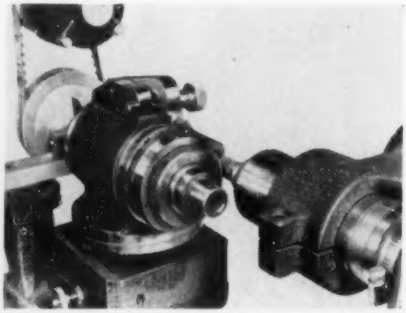
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METHOD FOR PRODUCING CAMS BY GRINDING

Royal Oak Tool & Machine Co., 29800 Stephenson Highway, Royal Oak, Mich., has found an interesting, money-saving method for producing cams on the R-O Universal Form Relieving Fixture that, in turn, can be used on the fixture to cam grind production parts.

The spindle housing is rotated 180 degrees. A master or exact replica is made of the cam form to be ground on the production part. A chucking arbor is left on one end of the master and an extended shaft on the other end for attaching handwheel or Gilmer pulley (power belt wheel). A cam blank is then installed on the spindle in con-



Cam being ground by high speed fixture

ventional position which, with the fixture turned 180 degrees, is at the grinding end.

The follower which contacts the master as the spindle is rotated, should have approximately the same curvature as the wheel, which will ultimately be used to grind the finished production parts. If a small wheel the same size as the pusher is to be used, the pusher may be set and locked in radial relief position. If a larger wheel is to be used to grind finished parts, the pusher should be removed and a stationary follower with the same radius as the larger wheel mounted in its place.

The carriage is set for radial relief only. As the spindle is rotated, the stationary follower interprets the master and moves the spindle housing, bringing the cam blank into the wheel, thus producing a cam with the identical shape on it.

The manufacturer offers a kit for converting fixtures to produce cams. The kit consists of (1) a stationary follower-mount to replace the pusher, (2) a short drawbar and nut for mounting the cam blank to give clearance for the grinder spindle, (3) a timing belt pulley is included for motorized fixtures of a ½ inch bushing for mounting the handwheel on the shank of the master.

For more data circle 153 on Postpaid Card

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METHOD FORMS ROD MILL ROLLS UP TO 75 PERCENT FASTER

A method to form and redress annular grooves, called "passes," in rod mill rolls up to 75 percent faster than present methods used by the steel industry is announced by The Sheffield Corp., Dayton 1, Ohio. Additionally, the new method is said to provide a higher quality roll, as well as longer roll life, as harder rolls are used.

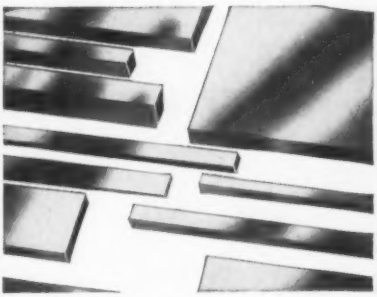


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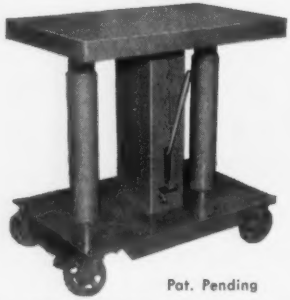
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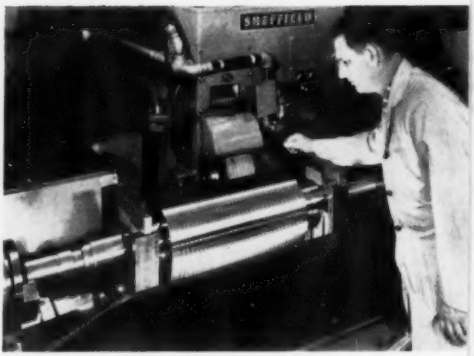
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new shop equipment . . .



Sheffield Multi-Form Grinding Machine was designed for forming and redressing rod mill rolls by means of the Crushtrue Process

The new method of forming "passes" in rod mill rolls is an extension of Sheffield's Crushtrue wheel forming and dressing process, used for precision thread and form grinding. With this process, multiple grooves and forms can be ground simultaneously from the solid in a single operation. The grinding wheel is dressed to the desired contour by a hardened steel or carbide Crushtrue roll, having the same profile as desired on that of the workpiece.

The rod mill roll to be formed is mounted between centers on a Sheffield Crushtrue Multi-Form Grinding Machine, where "passes" are ground simultaneously and automatically into the part from the solid in one operation. An automatic Crushtrue device, mounted directly above the wheel on the Sheffield Multi-Form Grinder automatically feeds the Crushtrue roll into the wheel until the full form of the roll, in reverse, is imparted into the wheel. This device redresses the wheel automatically after a preset number of rolls has been ground.

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THREAD CUTTING SCREWS

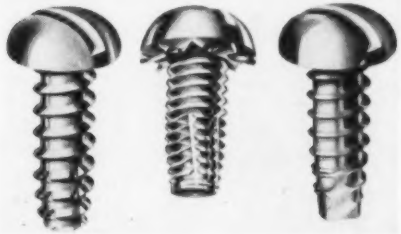
Parker-Kalon Division, General American Transportation Corp., Clifton, N. J., now offers three new, improved thread cutting screws for every application in every material.

The five cutting flutes on the improved P-K Type F and B-F are said to reduce pressure development by 80 percent. The completely formed threads on these tapping screws have sharp cutting edges and five deep flutes that are of continuous depth. These features make for better clearance of the accumulated material and assure minimum stresses in driving, and avoid the possibility of stripping or galling.

The P-K Type F cuts a machine screw thread as it is turned in. The Type F is ideal for making fastenings in castings, forgings, sheet metal, structural steel, plastics and resin-impregnated plywood.

Pentap, the P-K Type B-F, combines the five thread cutting flutes of the Type F with the coarse pitch, widely spaced threads of the P-K Type B. The P-K Pentap Type B-F distributes cutting pressure evenly, lets chips drop to the bottom of the hole and prevents cracking of material. They are ideal for fastenings in comparatively thin sections and bosses in friable and brittle materials.

Type L is a completely new and improved screw developed for use in nylon. The P-K Type L functions as



Parker-Kalon Thread Cutting Screws

CAM MILLING JIG BORING



A SPECIALIZED CAM MILLING SERVICE.
JIG BORING
...SPOT WELDING
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EXPERIMENTAL DEVELOPMENT

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EISLER ENGINEERING CO., INC.
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Frictionless —Rotary

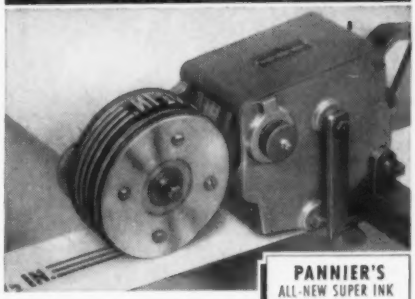
For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch.

Write for details.

GATCO ROTARY BUSHING CO.
42330 Ann Arbor Road, Plymouth, Michigan

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Internally fed unit.
Use inks from semi-paste to liquid, including light colored, heavy pigmented inks.
Continuous or repeat printing.
No stopping to add ink.
Print on 1" centers with multiple staggered units.

Super Ink Print-All clearly marks all conveyed materials traveling horizontally or vertically. It prints top or bottom surfaces as material moves under or over the printer.

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TAPPING PROBLEMS

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DOWEL PINS

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a combination thread cutting and thread forming screw, in that it cuts a small amount of the nylon to allow the full diameter threads to form. The Type L is of particular advantage in nylon assemblies which must be disassembled for service, because the P-K Type L can be removed and replaced without stripping or galling.

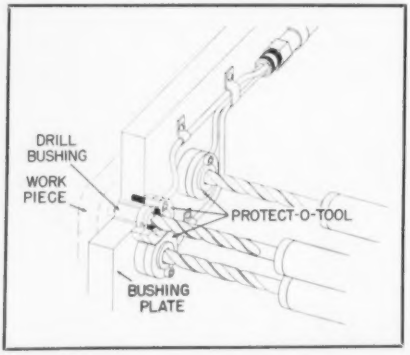
Parker-Kalon also announces a complete line of preassembled fastener-washer combinations, including all types of Sems and Staps. These are available in thread forming and thread cutting tapping screws, or machine screws, with slotted, Phillips or hex heads.

For more data circle 155 on Postpaid Card

★ modern machine shop ★

TOOL DETECTOR

A cost saving and preventative maintenance development in transfer type production machines is a tool detector, developed by The Cross Co., P. O. Box 3835, Detroit 5, Mich. It eliminates separate probe and inspection heads and stations, prevents processing of scrap parts and, by signalling the control panel and shutting



This drawing shows a practical application of the new Cross Protect-O-Tool

down the machine when one tool breaks, prevents additional damage.

Designated the Protect-O-Tool, this intelligence device is an electronic mechanism that senses the presence or absence of a tool or even a part of a tool in cases where a small piece of a drill or tap breaks off and remains in the workpiece. The device is mounted on bushing plates behind the regular bushing hole. Tool detection occurs as the drill or tap passes through the detector before and after machining.

Cost savings in eliminating separate probe and inspection heads and stations are realized in reduction of overall machine size, reduction of floor space requirements, as well as savings in eliminated cost of probe and inspection units.

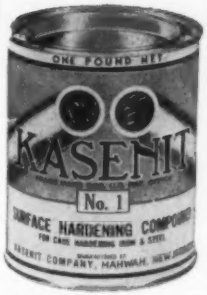
However, greatest impact on cost results from elimination of processing scrapped parts — especially on lines where conventional probe and inspection stations are widely separated in the line. In some instances, parts may be machined in 20 stations between these check stations. Where a tool breaks in the part in the first station following inspection, up to 19 scrapped parts are produced before the existence of broken tooling is known. Use of the Protect-O-Tool prevents this by shutting the machine down as soon as tool failure occurs.

For more data circle 156 on Postpaid Card

★ modern machine shop ★

OFFSET PRINTER

The Pannier Corp., 202 Sandusky St., Pittsburgh 12, Pa., announces that its Multi-Line Offset Printer was primarily designed to print specification identification, as required by government specifications, on stainless, titanium and aircraft quality steel. Mills using this unit have also found it efficient and practical for printing wide coils, prior to the slitting operation, thereby obtaining numerous printed



SPEEDY-SAFE
NON-POISONOUS
CASE HARDENING

Indispensable for Tool Rooms, Machine Shops, Schools, etc. Now available in 1, 5, 10, 25, 50 and 100 lb. containers.

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Est. 1912
55 King St., Mahwah, N. J.

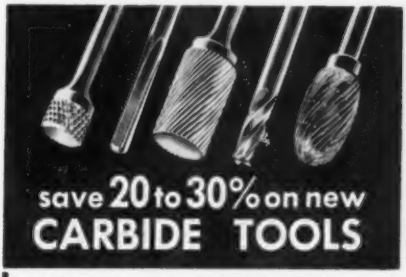
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- **STANDARDS · SPECIALS**

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DIVISION
PORTER MACHINE CO.
CINCINNATI 9 OHIO
30 YRS. SERVING INDUSTRY

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RICO has a complete line of:
- **Quality rotary carbide & HSS tools**
- **Available for immediate delivery**
- **Big savings on new tool costs**
- **Up to 50% savings on regrinds**
- **Special tools to specifications**
- **Distributor inquiries invited about better profit margins with RICO TOOLS.**

RICO

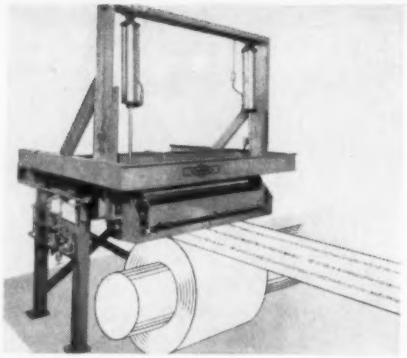
Attach ad to your letterhead for more information.

RICO TOOL CO.
5915 DIXIE HWY. • SAGINAW, MICH.

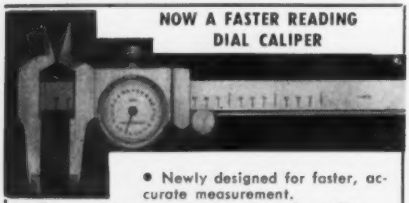
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strips as narrow as ½ inch. The unit is also being used profitably on sheets of gasket material and other materials where all-over identification or trademark printing is desired.

In Pannier offset printing, the dies are inked by a transfer roll and the impression is transferred, in reverse, to the offset printing roll which, in turn, applies the message to the material being printed. Offset printing automatically assures the best possible printing quality because it eliminates heavily inked or squashed impressions. Perfect printing always results when contact is made. Because the offset dies are in steady kiss contact with the ink and offset rolls and never contacts actual material being printed, there is minimum die and type wear. The pick-up and transfer roll system handles liquid fast-drying ink that can be



The Pannier Multi-Line Offset Printer



NOW A FASTER READING DIAL CALIPER

• Newly designed for faster, accurate measurement.
• Engraved beam graduations simplify reading.
• Knife jaws permit inside measurements, easy outside and depth measurements—can be locked in position • All operating components are completely enclosed. • Precision built from stainless steel and brass. • Two models—6" at $39.00, 8" at $42.00. *Write Today for Free Literature.*
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WE SPECIALIZE
20 CENTERLESS GRINDERS
ESTABLISHED 1939
Eastern Centerless Grinding Co.
470 Tolland Street East Hartford 8, Conn.

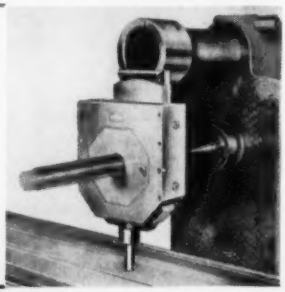
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DORDEN Vertical Shaping Attachment

Fits directly on any 1" regular horizontal milling machine arbor. Adjustable cutting stroke to 3". Swivels in two directions for taper shaping.

Indispensable for punch and die work, gauges and any general tool work requiring inside shaping to close tolerance. *Write for folder.*

DORDEN & CO., 18750 FITZPATRICK AVENUE DETROIT 28, MICHIGAN



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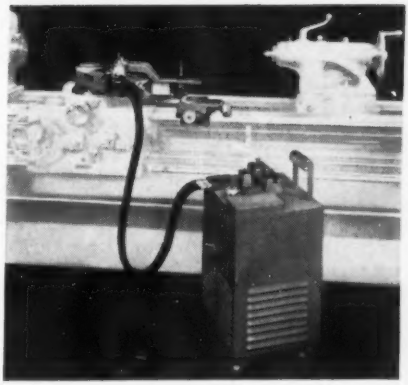
pumped through the reservoir if mills plan on long, uninterrupted printing periods.

For more data circle 157 on Postpaid Card

AIR-GAGE TRACER UNIT

A completely self-contained Air-Gage Tracer Unit is available from The Monarch Machine Tool Co., Sidney, Ohio, for application to Monarch lathes in the field. Designated as the Air-Tracer Pak, it may be used on Series 60, 61 and 62 machines without any reduction of swing capacity.

Removal of the regular compound rest permits quick attachment of the tracer slide assembly to the cross slide. This assembly consists of a hydraulically powered tool slide and a swivel base, having the proper height and bolt circle size for application to the lathe with which it is to be used. Being of the swiveling type, this adaptation of the Monarch Air-Gage Tracer has the versatility needed to handle the more complex turning, boring and facing operations.



The Monarch Air-Tracer Pak for lathes

The template support is clamped to the front bed V. Micrometer dials are provided for longitudinal and cross

SAVAGE
NIBBLING MACHINES



NIBBLE your COSTS
• No sparks
• No open flame
• No oxidation • No secondary operations

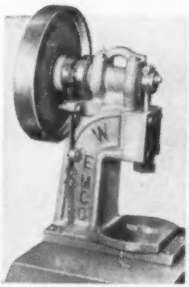
Totally enclosed head . . . . for safety.
Direct-over-center positive drive . . . gives more power.
One-piece 360° revolving head . . . . for fewer parts and longer life.

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Investigate
the EMCO W Power Punch Press



Not the cheapest machine in its class—not by any means. But EMCO 5-ton and 10-ton power punch presses, bench type or stand-mounted, are built so soundly for speed, safety, long life and profit that you should write for our descriptive Bulletin M-5.

KLAAS MACHINE & MFG. CO.
4334 East 49th Street Cleveland 25, Ohio

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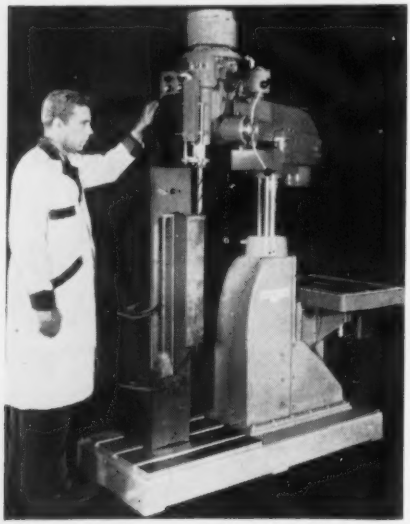
adjustment of the template position. For quick and accurate template alignment, a swivel pin on the support is used with a micrometer adjusting bracket. Appropriate mounting holes allow the bracket to be positioned properly for both short and long turning templates and for facing templates.
For more data circle 158 on Postpaid Card

★ modern machine shop ★

RADIAL DRILLS

New improvements in its line of precision radial drilling machines are announced by I. O. Johansson Co., Skoke, Ill. Both the range and capacity of the 1, 2 and 3 h.p. models has been increased.

The machine incorporates two work stations, accessible through 360 degrees rotation of ram. Rear work platform, for handling tall workpieces, has been enlarged to 21½ by 24 inches, and is a precision ground surface, equipped with three ½ inch T-slots. Adjustable table at front of machine is available in two sizes, 20 by 28 and 20 by 40 inches. Three T-slots and a coolant trough are incorporated into the tables, which are ground to an accuracy of 0.004 inch over the entire surface.



I. O. Johansson Radial Drilling Machine

Sliding radial arm can be moved to within 5 inches of column or out to drill to center of 5 foot circle. Ram housing is cast and improvements in precision ground machine ways allow greater ease and sensitivity of ram movement.

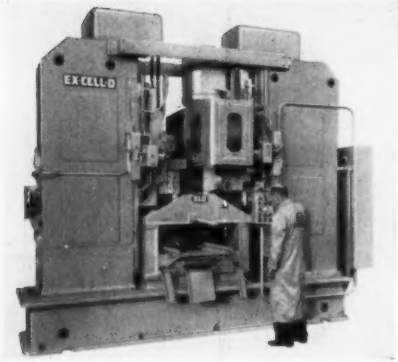
The upright column housing is a heavy walled, one piece casting. Vertical movement permits a maximum of 53 inches from spindle to working surface, 3½ inches minimum.

Increased size of machine now makes it possible to swing a workpiece over four feet high and five feet in diameter.

The control panel is cast and incorporates an oiltight closure. It consolidates all controls to left of drilling head for operator convenience, regardless of drill head position. Included are main motor control and switches for automatic locking of ram and column movements, motorized elevation and lowering of ram, power down feed to quill and automatic tapping.

The automatic locks and power elevation attachments are designed so that the drill head can be locked in desired position radially and horizontally and yet be moved vertically with the drill remaining square to the table within 0.002 inch in 12 inches of travel. Holes up to 18 inches deep can be drilled by utilizing this device.

The direct gear drive provides eight spindle speeds which can be instantly selected without stopping the motor. Speed ranges have been increased to cover a range from 60 to 2,400 r.p.m. Drill capacity up to 1¾ inches in cast iron is offered.
For more data circle 159 on Postpaid Card



Ex-Cell-O Custom Vertical Boring Machine

VERTICAL PRECISION BORING MACHINES

Two custom vertical precision boring machines are announced by Ex-Cell-O Corp., Detroit 32, Mich. Each machine is capable of rough and finish boring and chamfering as many as nine holes, ranging in size from 3/8 to 5 3/8 inches in diameter in one pass.

The machine base and standard columns are of heavy construction. Standard, hydraulically operated vertical slides carry precision boring spindles, mounted in clusters.

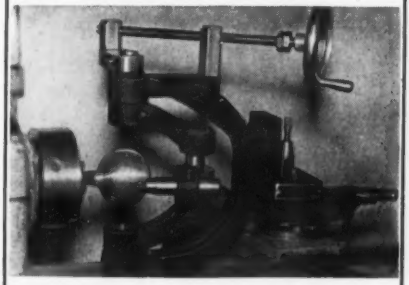
The design permits ease of maintenance and provides flexibility for changes in product design.

In operation, the flywheel housing is manually loaded and rough located. The operator initiates the hydraulically operated clamping cycle, causing elevators to raise the part to the machining position, where pins provide positive location. Wedge clamps lock the work in position.

Bore sizes are held as close as plus or minus 0.0005 inch, locations within plus or minus 0.0015 inch. Net production is 18 pieces per hour.

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New **RADITURN** √



CUTS ANY RADIUS

Convex, Concave or Ball

Patented

The accurate short cut for turning any radius. Adaptable to most any lathe.

Contact your tool supplier or write for details.

RETCO MFG. & SALES

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You Need an Extra Hand Now to Speed Up Production!

HEIMANN TRANSFER SCREW SETS



IN 11 SIZES—No. 6 to 1" N.C. In all S.A.E. sizes.

Here is the *faster*, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

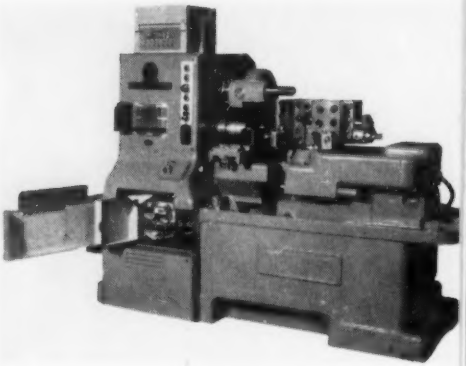
HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 539 on Postpaid Card

AUTOMATIC TURRET LATHE WITH TAPE CONTROL

Availability of tape control as optional equipment for its automatic turret lathes is announced by Potter & Johnston Co., Charter Oak Blvd., West Hartford 1, Conn. Operating under the new control system, all motions of the spindle, turret and cross slides—including all speed and feed changes—are programmed on an easily prepared punched tape. Since the tape used in the P & J Control System is not numerical or digital, no mathematical computations are involved in the preparation. Therefore, no computer is needed.

The on-machine control knits are unusually compact. Installed as integral parts of the machine, they do not require any additional floor space. Of special importance is the fact that this system—in additon to being supplied with new machnes—can also be added to any current P & J Automatic.



Potter and Johnston Automatic Turret Lathe

For more data circle 161 on Postpaid Card

HOLES



HIGH-PRODUCTION
CLOSE TOLERANCE IN ONE PASS
Clark "HOLE MILLS"
P. O. BOX 990 BEVERLY HILLS, CALIF.

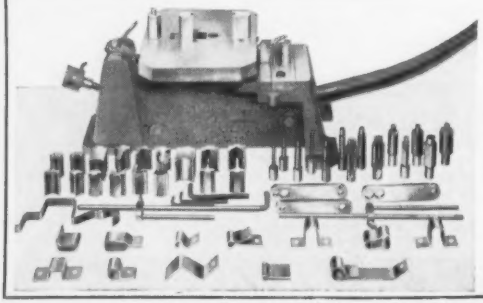
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NEW EXPANDING COLLET pat. pend.
Inside chucking to .0005 T.I.R. 5C, 4C, 3C, 3AT, 2J sizes in stock.



Order 5C size complete $15.95. Machinable from 1⅝" to ⅜" dia., sizes up to 6" dia.
THE DUNHAM TOOL CO., INC.
Danbury R4, Conn.

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Multiform
BENDER CUTTER
Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.
AIR OR HAND MODELS FOR UP TO ¼" to 4" MATERIAL
Write for brochure which illustrates and describes the four bender models.
J. A. RICHARDS CO.
Dept. 6-M **Kalamazoo, Mich.**

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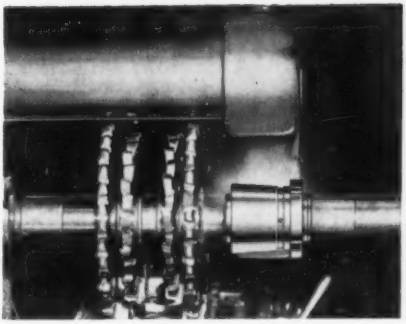
ROLLER BEARING

Sonnet Tool & Mfg. Co., 580 North Prairie Ave., Hawthorne, Calif., announces a roller bearing for milling machine overarm support, which replaces the usual bronze bearings. It has been redesigned to permit lubrication of the bearing by the milling machine overarm lubrication system. This improvement assures proper lubrication and eliminates having to remove the bearing periodically for lubrication.

Use of this roller bearing permits fast feeds and speeds, results in better finishes and prolongs cutter life. Bearing heating, bearing seizures and twisted arbors are eliminated.

The roller bearings are easily installed without machine rework, require no extra space and can be quickly taken from one machine and installed on another. No adjustments to the bearings are required.

Each roller bearing is supplied with two sets of arbor bushings to accommodate the next two smaller diameter arbors.



The Sonnet Roller Bearing is shown in use

Sonnet Rollers are stocked for the following makes of milling machines: Kearney and Trecker, Cincinnati, Sundstrand, Brown and Sharpe, Kempsmith, Van Norman, Gorton, Kent-Owen and Greaves.

For more data circle 162 on Postpaid Card

Accurate Hole Transfer Made Easy With

NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



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17336 Lahser Road
Near Grand River
Detroit 19, Michigan

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CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

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15 LOCUST AVENUE, ROSELAND, N. J.

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PIONEERS and PACEMAKERS in their line



—head rivets from smallest to 3/4" diameter cold steel, either by NOISELESS SPINNING or VIBRATING HAMMER method — fast, economically — types include Vertical and Horizontal Spindles, foot-power or automatic.

Free estimates of your work.
Write for catalog today.

THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

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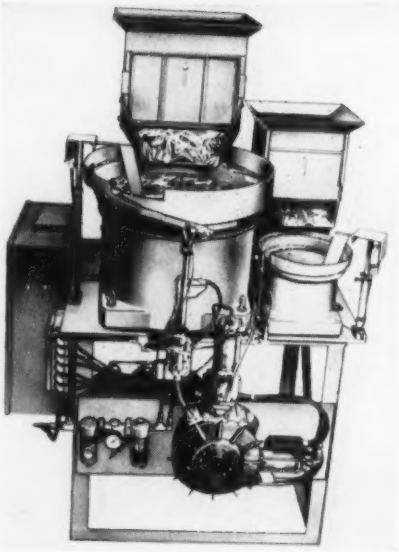
new shop equipment . . .

AUTOMATIC ASSEMBLY MACHINE

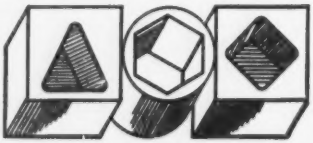
A completely automatic assembly machine, pushbutton controlled, incorporating two electromagnetic vibratory bowl type parts feeders, has been built by Syntron Co., 309 Lexington Ave., Homer City, Pa. The machine is capable of assemblying 2,400 pen tips and barrels an hour, with 85 percent or better production efficiency.

Components are supplied to the parts feeders from two hoppers, which are a part of the machine. This supply is automatically controlled by bowl level switches in the parts feeders. These switches energize the electromagnetic vibrators on the hoppers when the quantity of parts in the bowl of the feeders reaches a predetermined low.

The bowl type vibrating parts feeders automatically orient the individual



Syntron Automatic Assembly Machine

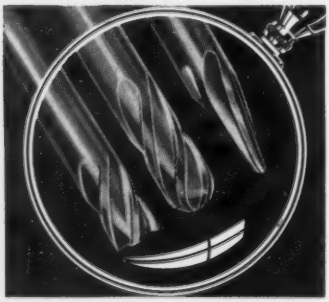


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BY A QUICK, EASY, INEXPENSIVE METHOD
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WATTS BROS. TOOL WORKS
Wilmerding, Pa.

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CUT TOOL COSTS
broken tools made like new again with NU-TANGS*
Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6) Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.
NO WELDING! NO SLEEVES!
NO SHORTENING! NO DISTORTION!
Send them to us like this! GUARANTEED STRONG AS NEW! *We return them like this!*
* Patent No. 2,512,033
NU-TANGS INC. 1339 Bates Avenue Cincinnati 25, Ohio

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10 to 20 Times Longer Cutting Life Means Lower Tool Costs

"DIXIE" provides End Mills of solid carbide with cutting edges processed with exclusive "Micro-Finish" to assure the user of long-lasting, super sharp tools.

FOR PRECISION FINISHING



DIE SINKING, HOLE SIZING AND CUSTOM TOOLING

DIXIE SEND FOR OUR NEW CATALOG
DIXIE TOOL INDUSTRIES
4555 W. FRANKLIN AVE.
BRIDGEPORT, MICHIGAN

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components into single line external gravity feed tracks equipped with photo eyes.

Upon signal from the 12 station index table, a barrel is discharged from one gravity feed track at station one. It is in a vertical position, with pointed end up over a flaring anvil. At station two, a pen tip is discharged, pointed end up, from the other parts feeder's gravity feed track, and is flared inside the barrel. Following stations discharge the automatically assembled barrel and tip to tote boxes.

For more data circle 163 on Postpaid Card

25 TON PRESS

A 25 ton high production press with a production line capacity of 1,000 strokes per minute has been developed by E. W. Bliss Co., Press Division, 1375 Raff Rd., Southwest, Canton 10, Ohio. Called the Bliss Model 1625, the new press is used to manufacture Truarc rings and, through the use of a triple-cavity die, stamps the rings in a variety of sizes and shapes at the rate of 3,000 per minute. The press incorporates a number of special design features which permit its extremely high speed. Most unusual of these is a counterbalancing system, which works in opposition to the force frequencies set up by the slide and, in effect, nullifies them, thus minimizing vibration.

Other special features include: a recirculating oil system which provides lubrication to main bearings, connection bearings and gibs. The oil system is monitored by interlocks which stop the press instantly if the pressure varies either up or down from the line pressure of five pounds. Not only will the interlocks shut the press down, but they immediately register the point of pressure failure — the source of the

"SEALFLEX" TUBING



Leakproof— Stays in place
For Coolants, Cutting Oils, Solvents
Made of steel with brass fittings — males, nozzles, stopcocks, etc., made in ⅛", ¼", ⅜", ½", ¾" I.D. *Write for bulletin and prices.*

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Lyndonville, Vermont

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SPELLMACO "SPOTTERS"
A matched set of transfer punches for toolmakers, machinists and tool cribs
Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.
Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.
SET #3-17; 28 punches with indexed stand—sizes 3/32" to ½", by 1/64"—plus handy 17/32" size. Length 4⅞". ONLY $17.90.
Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

For more data circle 551 on Postpaid Card

trouble — at a central lube control panel. This permits instantaneous correction without the necessity for tracing all oil lines.

Additional features include an electric clutch which permits rapid torque pick-up and extremely quick stops; roller bearings on the throw block; spherical bearings on the tube lever,



E. W. Bliss 25 Ton High Production Press

and tapered anti-friction bearings on the shaft mounting; the press has a half inch stroke, with solid connections, and a bolster adjustment of one inch; bed opening is 16 inches right to left, and 5 inches front to back—bolster plate area is 12 inches front to back and 20 inches right to left; feeding coil strip into a press operating at 1,000 strokes per minute made necessary the



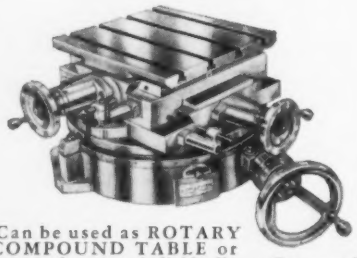
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- Hand Chisel Cut for Hard Metals.
- Carbide Rotary Files.
- Salvage and Regrinding Service.
- Dealers Inquiries Invited.

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BROOKLYN 19, N. Y.

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ROTARY COMPOUND TABLES IN 3 SIZES



Can be used as ROTARY COMPOUND TABLE or *separated* to use *individually* as Compound table *alone* and Rotary table alone—all on *one* investment

The Stevens-Three-in-One will save set-up time and reduce inaccuracies caused by multiple set-ups.

See your dealer or write for bulletins

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

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REICH—THE ONLY 3-WAY PRECISION TEST INDICATOR

Accurate and repeated reading in either direction. No mirror needed to read both sides or top. Non rust, non magnetic movement. .014" reading.

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J. R. REICH MANUFACTURING CO.
201 E. Stroop Road Dayton 29, Ohio

For more data circle 554 on Postpaid Card

development of a precision light duty single roll feed, set to pull the strip through the press; a heavy four piece cast Meehanite frame — the frame members are keyed to one another and joined by preshrunk steel tie rods, to provide a rigid frame with a minimum of deflection; the pedestal type combination clutch and motor control includes a reversing starter, fusible disconnect switch, control circuit transformer and enclosed clutch control relays.

For more data circle 164 on Postpaid Card

HYDRAULIC SHEARS

A complete line of hydraulic shears is available from Verson Allsteel Press Co., 9300 South Kenwood Ave., Chicago 19, Ill. Shear capacities of standard models range from 8 foot lengths of ⅜ inch mild steel, through 12 foot lengths of 1½ inch mild steel. In addition, special capacities are available to meet any requirement.

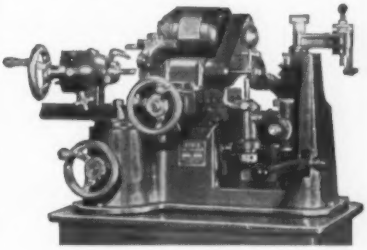
Verson Shears are designed with a minimum shear angle of 1 1/6 inches per foot, eliminating curling of the sheared piece, a definite asset when working with light gauge materials.

All shears are equipped with automatic control to keep the ram operating at a predetermined shear angle. This angle is adjustable by a handwheel located at the operator's station. Power operated back gages are controlled and operated from the front, easily accessible to the operator. Shears are also equipped with a front gage and a squaring arm for precise alignment of stock.

Ball transfers in the bed allow easy movement of stock. When properly aligned, stock is held in place by hydro-pneumatic hold downs. Knife guards provide operator safety. Shear blades are readily accessible from the rear, permitting easy replacement. A

HYBCO TAP GRINDER

Sharpens Chamfers, Flutes and Spiral Points



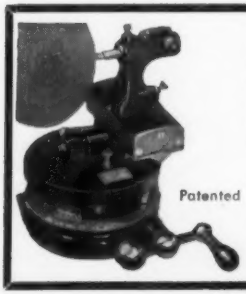
MODEL 1100

• **Capacities No. 0 Machine Screw to 1½" Hand Taps.**

HENRY P. BOGGIS & CO.

708 E. 163rd St., Cleveland 10, Ohio

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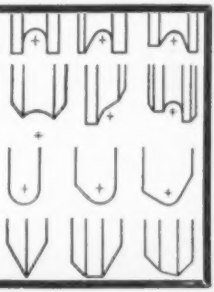
Patented

WHY WASTE TIME?

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REPRESENTATIVES WANTED IN SOME AREAS



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CAMS

Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC
23-16 44th Road Long Island City 1, N. Y.

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HOLES



PRECISION HOLE FINISHING
WITH FLOATING CUTTER
Clark "FINISHING BARS"
P. O. BOX 990 BEVERLY HILLS, CALIF.

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MARK OF QUALITY

STANDARD

MACHINE KEYS



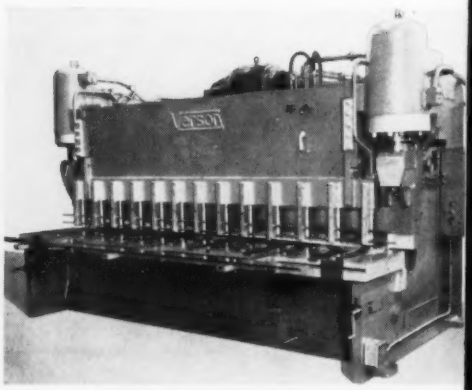
We are able to furnish the following types of finished machine keys of any size and taper: Gib head taper keys, Plain taper keys, Straight keys, Round end feather keys, and Tit keys. We can supply you quickly with the quantities you need at the specifications you require.

Send for new catalog giving complete information on Woodruff keys, taper pins, machine keys and machine racks.

STANDARD STEEL SPECIALTY CO.
BEAVER FALLS • PENNSYLVANIA
Plants: Beaver Falls, Pa.; Hammond, Ind.

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new shop equipment . . .



Verson No. HPS-750-12 Hydraulic Shear

stroke control, with limit switches both top and bottom, is adjustable through the entire range of the stroke. When narrow pieces are sheared, the stroke can be easily shortened to obtain greater productivity.

For more data circle 165 on Postpaid Card

★ modern machine shop ★

TAPPING MACHINE

Completely automatic tapping operation is offered by a unit type tapping machine, Model 409-S, manufactured by The Morris Machine Tool Co., 2011 Eastern Ave., Cincinnati 2, Ohio. Designed to process ½ inch electrical conduit locknuts, the four spindle machine selects, positions, loads, taps and ejects 1215 pieces per hour at 80 percent efficiency. Units are also available for ¾, 1, 1¼, 1½ and 2 inch size locknuts.

The Morris High Production Machine consists of a vertically mounted four spindle individual lead screw tapping unit, two motorized hoppers and feed mechanisms and four fixtures, all mounted on a common cast iron

base with a platen face machined on top. These components are lubricated automatically with an oil mist lubricating system. The fixtures are fed by four tracks, two originating from each hopper, and are automatically operated. Parts are oriented so that they arrive with concave side down. This assures that any burr is left on the concave side when the locknuts are tapped. The parts are transferred to the workholding fixtures by an air operated shuttle mechanism. As the parts enter the fixture, cog-like guide rails orient the locknuts on their lugs for proper positioning. The parts are secured in position by an air operated equalized clamping mechanism, which is actuated electrically when the shuttle has correctly positioned the parts.

Cycle time is approximately 9.5 seconds, based on operating the taps at



☆

Here's a Unique Steel Type Holder . . . the NEW Slot-Lock Model

MANY FEATURES:

- For general purpose marking which requires multiple characters and frequent changes in the setup
- The type seats on a special hardened anvil which insures uniform depth of impression and prevents type recession
- Type inserts cannot be put into holder incorrectly
- All type is locked in place securely by a properly-hardened, tempered spring
- Type changes can be made quickly and easily
- Uses type made by NM 'Cold-Upset' process.

NOTE—the Slot-Lock is also available for machine or press operation.

for ALL-PURPOSE MANUAL PRODUCT MARKING

ABOUT NEW METHOD MANUAL DEVICES

Whatever your hand marking requirements, New Method has a COMPLETE LINE OF PRODUCTS and the experienced personnel to take care of them—products for any kind of marking on any shape of surface. You'll find all these, and more, illustrated fully in the new MS-59 Catalog.

The New Method 'COLD UPSETTING' PROCESS

This is a special metal treating process which assures much longer stamp life and better marking than can be attained from machine-cut characters. The 'Cold-Upset' process, developed by New Method engineers, and refined by years of research, has withstood the on-the-job test of time.

OTHER NEW METHOD MARKING DEVICES

* A complete line of automatic roll markers for most marking requirements, each designed for a specific need.

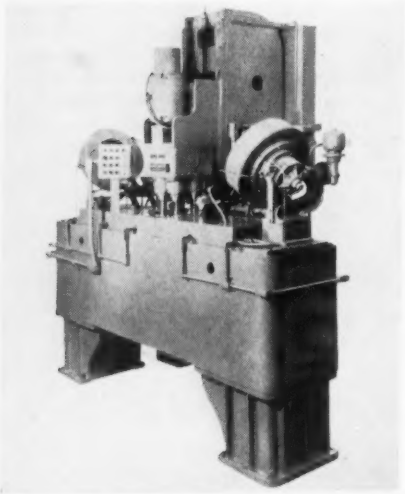
Write today for NEW CATALOG MS-59

NM SINCE 1931

NEW METHOD STEEL STAMPS, INC.

147 JOS. CAMPAU • DETROIT 7, MICHIGAN

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The Morris Model 409-S Tapping Machine

35 s.f.p.m. After the unit is cycled, the part is automatically unclamped and ejected directly to a tote basket as the unit retracts. The machine is arranged for, and equipped with, a low presure coolant system.

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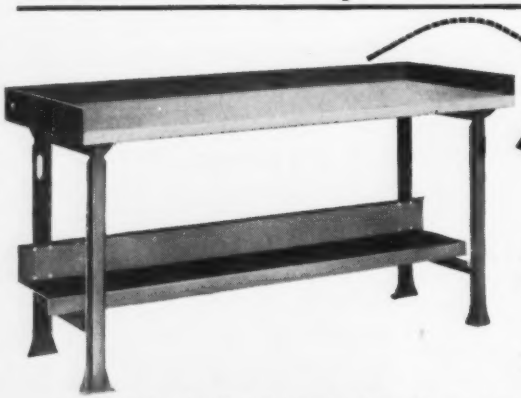
★ modern machine shop ★

METALLURGICAL MICROSCOPE

Bausch & Lomb Optical Co., 893 St. Paul St., Rochester 2, N. Y., announces a line of metallurgical microscopes for routine applications in industry and schools. These instruments are specially designed to provide quick, accurate examinations of metal specimens and other opaque objects with high quality results.

The microscopes are easy to operate and are designed for the maximum in user comfort. The fine adjustment knob is located only a short distance above the table top, allowing the arm to rest

Good Work Requires A Good Bench.



ONLY **$61.92** 30" x 5 Ft.

LAMINATED MAPLE TOP

Solid, quiet, non-skid and non-conductive.

ELECTRIC SOCKET

Can be mounted on leg for convenient use of power tools.

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BAY PRODUCTS INC. 1825 CAMBRIA ST., PHILA. 32, PA.

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Guaranteed accurate readings within .001″



PRECISION VERNIER CALIPER

Hardened; Standard Finish, Stainless and Dull Chrome Finish; Inch and Metric Scales; Sizes 5″, 6″, 8″, 10″. Also large Vernier Calipers.

Ask for literature on other Helios Products, Swing Jaw Calipers, Parallels, Hole Gages, Telescoping Gages, Radius Gages.

SAVE TIME WITH HIGH QUALITY INSTRUMENTS AT REASONABLE PRICES!



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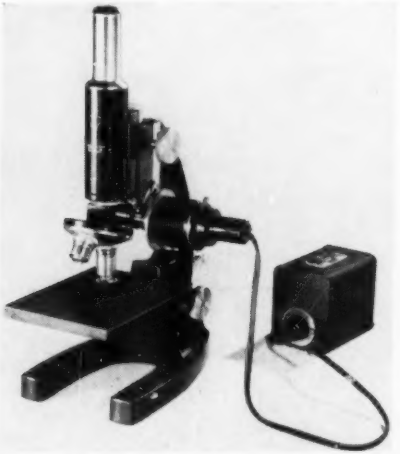


NEISE MODERNTOOLS

KARL A. NEISE
404 Fourth Ave., Dept. MMS-59
New York City 16

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in a natural position and making the slightest change in focus a routine matter. The instruments feature full-sized control knobs which are easy to grasp for all adjustments. All objectives are parfocal and centered in a revolving nosepiece, which adjusts automatically for wear. They are easily portable for on-the-spot examination and analysis.



Bausch and Lomb Metallurgical Microscope

The B&L Metallurgical Microscope is available in two models: Model AM-1 (one 8x, one 40x Achromatic Objective, one 12.5x Huygenian Eyepiece) and Model AM-2 (one 8x, one 20x, and one 40x Achromatic Objective; one 7.5x and one 12.5x Huygenian Eyepiece). Standard equipment on all models includes BALcoted optics, monocular body, fixed stage, simplified vertical illuminator, double revolving nosepiece, built-on illuminating unit and transformer.

For more data circle 167 on Postpaid Card

★ modern machine shop ★

SKELP WELDER

Sciaky Bros., Inc., 4915 West 67th St., Chicago 38, Ill., announces the new

WALLACE BENDS

give tubing, pipe, structural shapes and solids the contour you need for the use intended. That is why production men have been bringing bending problems to Wallace since 1896. It is the time-proved way to bend a production curve upward and a cost curve down.



WALLACE BENDERS

serve outstanding metal fabricators the world over, many of them exclusively. The complete Wallace line includes ram benders, rotary and roll benders, automatic and manually operated, in the widest range available. For the job you do, Wallace builds the bender.

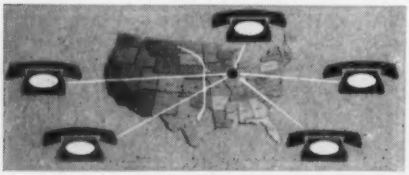


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Ask for Bob Baxter. It's the quick, direct way to expert help on a bending problem. Wallace pays charges. Call Bob Baxter now.



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new shop equipment . . .

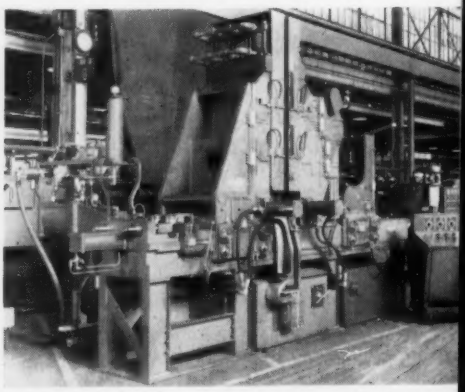
design of a BPW.3-400H flash-butt type welder in principle for the continuous end-to-end fastening of flat wide strip stock.

This flash-butt welder, often referred to as a skelp welder, is used in various mill and process operations. Its most common use is associated with plating, pickling, stamping, forming and other operations where a continuous feed of strip stock is essential. Looping pits are sometimes used to take up slack during a weld interval.

In a matter of seconds a high strength weld is made, which is as strong as the parent metal. This machine also shears off flash particles so that a continuous flush surface is maintained. At the same time, the manufacturer's requirements of economy, strength and high production are met.

This Sciaky BPW.3-400H Machine is designed for flash-butt welding hot rolled, low carbon steel ranging from 0.060 to 0.200 inch in thickness and from 12 to 22 inches in width; or, a maximum capacity of 4.5 square inches cross sectional area of mild steel, and 2.6 square inches of stainless steel.

For more data circle 168 on Postpaid Card



Sciaky BPW.3-400H Flash-Butt Type Welder

STEEL HARDENING COMPOUND

A small-size package of steel hardening compound for testing purposes is announced by Hard-N-Tuff Corp., Dept. MM, Box 275, Huntington, L. I., N. Y. The new package contains enough Hard-N-Tuff to harden all the chisels, drills and other tools in a fully equipped home workshop. It is, therefore, ideally suited for initial testing of this unique steel hardening process by industrial plants seeking a means of hardening production tools, dies, jigs and fixtures or manufactured parts.

Hard-N-Tuff has case hardening qualities which are said to more than triple the life of tools and parts, thus lowering the production costs both in the maintenance shop and in the plant.

Non-toxic and non-flammable, Hard-N-Tuff is applied by a simple heat treating operation that takes only a few minutes and requires no special equipment. By carburizing, nitriding and chromizing in one operation, it gives mild steel the hardness of high carbon alloys, leaving its inside core tough and non-brittle.



Hard-N-Tuff Steel Hardening Compound

For more data circle 169 on Postpaid Card

★ modern machine shop ★

DUAL HEAD MILLER

Barker Engineering Co., 500 Green Rd., Cleveland 21, Ohio, introduces its

They both get identical readings



thanks to automatic gaging uniformity of

COMTORPLUG

precision internal gage for .0001″ tolerances



If you produce precision holes in volume, your operators with *precise gaging knowledge* can:

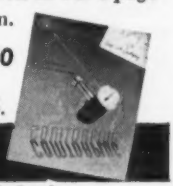
- eliminate rejects.
- improve quality.
- speed production.

Comtorplug tells:
Actual hole size; large .0001″ graduations; fixed, not passing, reading.
Front or back taper, exact amount of.
Ovality, exact amount of.
Bell mouth or barrel shape, exact amount of.



Comtorplug's moderate cost lets you put precision gaging everywhere needed. Comtorplug's *precise gaging knowledge* is giving a big pay-off in aircraft, automotive transmission, electric motor, household appliance and other fast-moving programs. Get the facts in our 8-page fully illustrated Bulletin.

Request BULLETIN 50

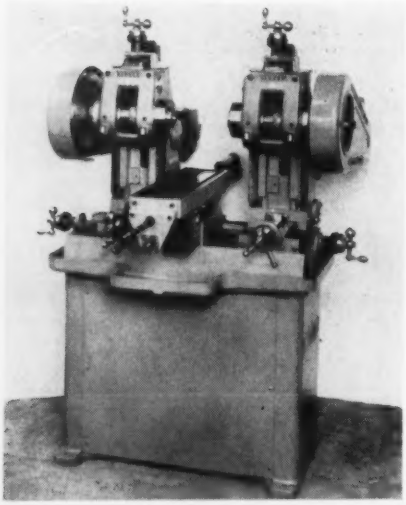


COMTOR COMPANY, 64 FARWELL ST., WALTHAM 54, MASS.

COMTORPLUG

For more data circle 564 on Postpaid Card

new shop equipment . . .



The A. M. Dual Head Milling Machine

A. M. Dual-Head Milling Machine, which was designed to handle a wide variety of operations.

It is claimed that all milling operations on parts can be increased as much as 100 percent while, at the same time, the handling of material by the operator can be reduced as much as 50 percent.

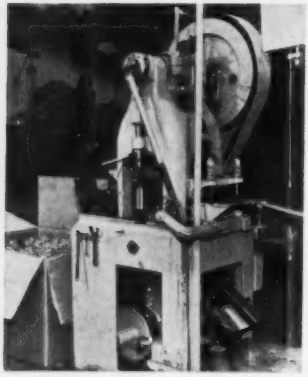
There are a total of seven movements that can be operated air hydraulically. The travels are as follows: the columns can be brought together so that there is a minimum distance of 2¾ inches and separated to a maximum distance of 11 inches between the two spindle faces.

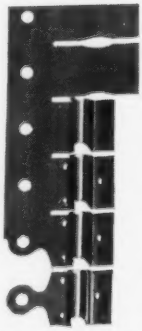
The columns can be moved from front to rear together or independently a distance of 3¼ inches. Each head can be raised a minimum of 2 inches and a maximum of 8 inches from the top of the table, which is 20 inches long, 6 inches wide with a 10 inch travel.

For more data circle 170 on Postpaid Card

1500% MORE PIECES PER DIE SHARPENING

on this HAVIR Press
(formerly DIEBEL)
with Exclusive
Cylindrical Ram





OLD METHOD on O.B.I. presses required three 5 station dies that had to be sharpened every 50,000 pieces. Punch breakage was high. Two O.B.I. presses working two shifts produced 25,000 pieces per day.

NEW METHOD on a HAVIR 12 Ton Hi-Production Automatic produces as high as 800,000 pieces per grind with less punch breakage. These calendar pencil clips are made from .008" stock at the Brown & Bigelow plant in Minneapolis.

This 1500% increase in die life is dramatic proof that the HAVIR exclusive cylindrical ram cuts die deflection to a minimum.

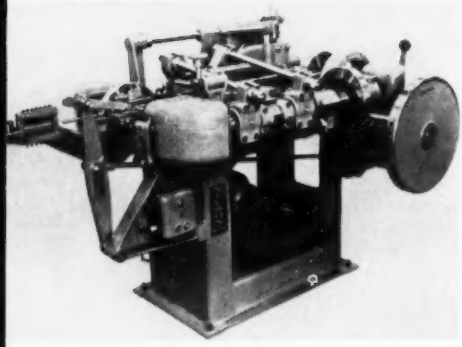
PRESS-RITE DIV.

HAVIR (formerly DIEBEL) Hi-Speed Automatic Presses available from 5 to 150 Ton. Ask your HAVIR Dealer or write direct.

Sales Service Mfg. Co.

2361 UNIVERSITY AVE. • ST. PAUL 14A, MINN.

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No. S-1-F Four Slide Forming Machine

FORMING MACHINE

The A. H. Nilson Machine Co., 603 Bridgeport Ave., Shelton, Conn., announces a stronger, more compact No. S-1-F Combination Press and Four Slide Forming Machine. The unit is mounted on a welded steel pedestal base to provide maximum strength and rigidity.

To achieve minimum floor space, the variable speed motor drive is positioned directly in back of the machne, instead of on the end. Floor space required is only 53 by 57 inches, a reduction of more than 1,000 square inches compared to the previous model. Other new features include double gibs, a twin disc clutch and redesigned gear guards.

The S-1-F Machine, designed primarily to stamp and form ribbon metal in one operation, will also form wire with a maximum feed length of 8 inches. It can handle wire up to 3/32 inch in diameter and ribbon metal up to 1¼ inches wide. The built-in press section has a ¾ inch stroke and a maximum pressure capacity of 8 tons. A 2 h.p. motor drive permits speed ranges from 57 to 200 strokes per minute.

For more data circle 171 on Postpaid Card

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

DETAIL CHASE and PUNCH for Quick Stamping of Nameplates



MODEL 24

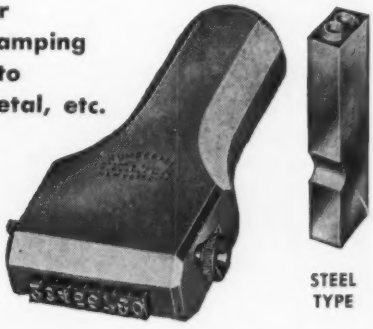
An ingenious tool for rapid stamping of plain, etched or embossed nameplates. Used in a small Kick or Power Press, or in our No. 93 or No. 131 Bench Press. Steel Type and Logo Type are dropped into recess. Logo Type are used for numerical and letter combinations.

All lines are stamped in one operation, making tool very efficient. Small, as well as large lots can be stamped economically, neatly. Write for Bulletin MS-24.

We can also make steel type with round face characters.

IMPROVED TYPE HOLDERS

for stamping into Metal, etc.



STEEL TYPE

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to ½" figures and letters. *Write for Bulletin MS23H.*

NUMBERALL STAMP & TOOL CO.

HUGUENOT PARK STATEN ISLAND 12, N. Y.

Steel type and wheels available with round face characters.

For more data circle 566 on Postpaid Card

new shop equipment . . .

PACKAGING MACHINE

Thermoformed packages — known variously as blister, bubble or dome-pack—can be formed in a wide range of sizes and shapes on the Sundstrand-Packmaster Model 58, announced by Sundstrand-American Broach Division, Sundstrand Machine Tool Co., Ann Arbor, Mich. In addition to providing outstanding flexibility, the machine attains a high production rate. Packages measuring 4 by 4 inches are produced at 60 per minute with production of smaller packages being correspondingly higher.

Thermoformed bubbles become their own conveyor as they move through the machine. These vacuum-formed packages use the flange base, produced during the forming operation, to support the package and parts as both ride on the guide rails of the loading table during the packaging operation. A handwheel, calibrated for width setting, provides simple adjustment for a broad range of package widths. The table opens up or closes parallel to the machine center line through a linkage that assures accurate alignment. Table lengths depend entirely on the product or product package and the number of operators or automatic loaders desired on the particular line.

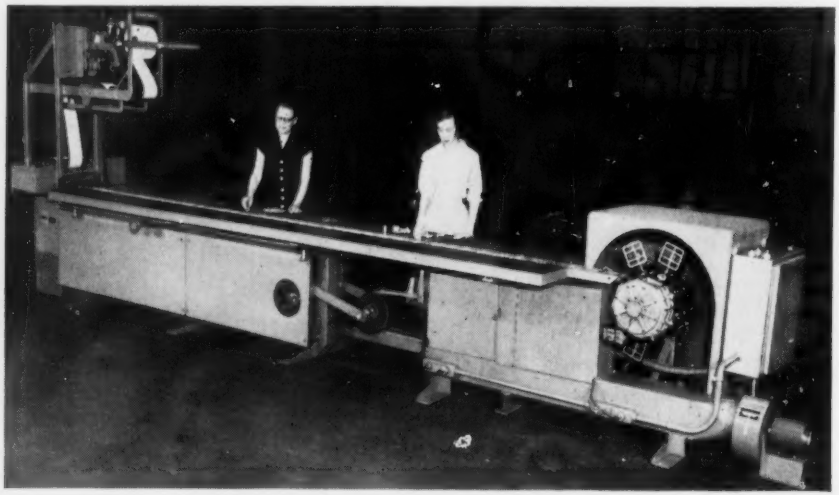
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★ modern machine shop ★

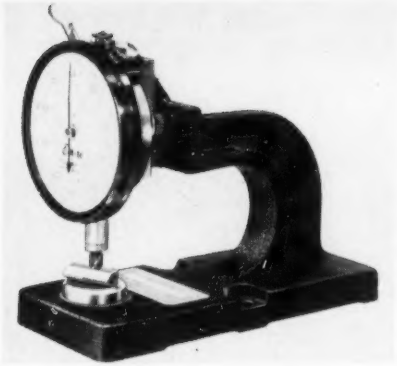
LIGHTWEIGHT COMPARATOR

A small, lightweight comparator, the Model B, has been added to its "Pet-line" Gages by Petz-Emery, Inc., Pleasant Valley, New York.

Because of its small size and light weight, the Pet-line Model B is ideal for portable, on-the-spot checking anywhere in the shop. It also makes a handy second comparator for the bench and is well suited for checking compressible materials such as leather, textiles and rubber, with a weighted indicator. A cast aluminum base on the Model B is rugged, though light, and has two countersunk holes for easy



Packmaster Model 58 Packaging Machine is designed for thermoforming sheet packages



Pet-line Model B Lightweight Comparator

mounting. It can be supplied with any Em-re Dial Indicator (illustrated with A.G.D. No. 3).

Measuring capacities — 0 to 1⅜ inches. Clearance, contact to throat, 3 1/3 inches; anvil—1 inch diameter.

For more data circle 173 on Postpaid Card

MACHINE FOR LAPPING OR ROLL BURNISHING

The Foote-Burt Co., Cleveland 8, Ohio, announces the Footburt-Schraner Model SFA which is a completely automatic machine for lapping or roll burnishing bearing surfaces on straight shafts or camshafts. Equipped with automatic loading and unloading devices, it handles shafts up to 36 inches long and with a maximum o.d. of 12 inches. Shafts with bearing surfaces ½ inch wide or more, and with at least 1¾ inches between centers can be accommodated. Maximum bearing o.d. with standard lapping heads is 3 inches.

The Model SFA can be equipped with a maximum of five bearing heads and 16 cam-lapping heads. Machines are available with either integral or separate hydraulic units. A 5 h.p. motor, equipped with clutch and brake, provides spindle drive. Floor space required is 66 by 84 inches, height is

1500° in 5 minutes
2300° in 30 minutes

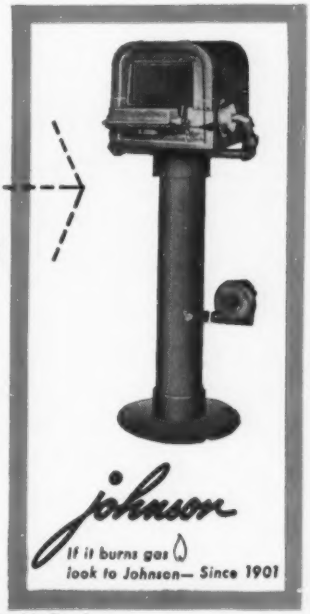
johnson **NUMBER 120 HI-SPEED FURNACE**

That's the kind of quick heating action you get with this compact, powerful furnace. It's economical to operate, too. Fast heat-up saves time and gas. High-temperature insulated firebox, 5" by 7¾" by 13½" gives even hardening of high speed and carbon steel dies, tools, and small parts. Temperature easily regulated. G.E. motor and Johnson Blower included. 120,000 BTU's per hour.

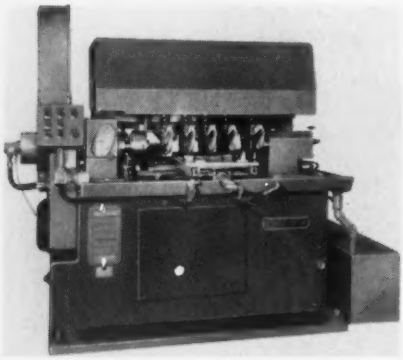


Pedestal style, F.O.B. Factory $184.00
No. 120 also available in bench style.
Write today for free Johnson catalog

JOHNSON GAS APPLIANCE COMPANY
571 E Ave., N.W., Cedar Rapids, Iowa



For more data circle 567 on Postpaid Card



Footburt-Schraner SFA Automatic Machine

62 inches and net weight is approximately 6,500 pounds.

For more data circle 174 on Postpaid Card

READING BENCH KEYSEATER

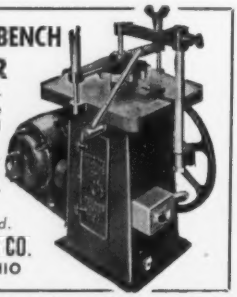
Portable — move directly to job; a time saver for both small and large shops.

3¾" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

READING MACHINE CO.
CINCINNATI 37, OHIO



For more data circle 568 on Postpaid Card

JIG BORING
and
Large Precision Machining
Done to your specifications
We have 22 Jig Borers
KIDDE PRECISION TOOL CORP.
15 LOCUST AVENUE, ROSELAND, N. J.

For more data circle 569 on Postpaid Card

DUST CONTROL EQUIPMENT FOR INDUSTRIAL OPERATIONS

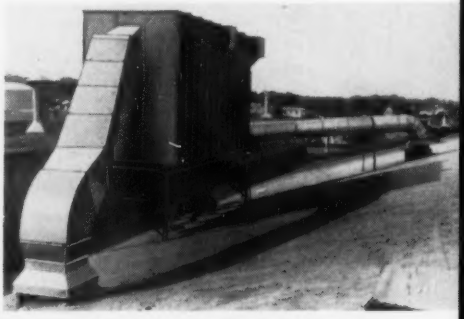
Cleaner air, better working conditions, reduced machinery maintenance costs and complete salvage of valuable dusts are the major benefits claimed by Aget Mfg. Co., 1398 East Church St., Adrian, Mich., for its Dustkop Filterkop, developed for industrial operations where the volume of air to be handled is unusually high.

Used in conjunction with standard vented Dustkops, the Filterkop receives all the air collected by these units, recovers nearly 100 percent of the dust load, dissipates harmful fumes and recirculates air that has been thoroughly cleaned.

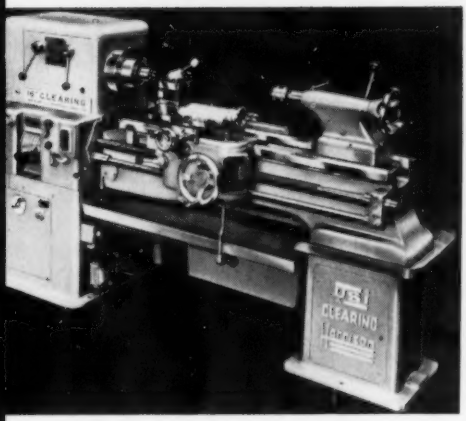
The basic unit of the Filterkop consists of heavy gauge steel housing, a hopper, 80 cloth filter tubes and a shaker mechanism. Accumulated dust is automatically shaken from the tubes into the hopper at the end of each fan operation.

Depending upon plant requirements, the Filterkop may consist of a single unit or any multiple thereof. One shaker serves two units and no matter how large the installation, only one air inlet and one air outlet are needed. Easy access for tube installation and inspection is provided by a large door.

For more data circle 175 on Postpaid Card



Shown above is the Aget Dustkop Filterkop



Clearing-Harrison Lathe is made in England

ENGLISH MADE LATHES

The Clearing Division, U. S. Industries, Inc., 6499 West 65th St., Chicago 38, Ill., has completed arrangements whereby it will sell and service English made lathes throughout the United States and Mexico. Clearing, hereafter, will be exclusive American representative for a new line of lathes called the Clearing-Harrison line, manufactured by T. J. Harrison & Sons, Ltd., Heckmondwike, Yorkshire, England. Clearing will sell an imported line of equipment manufactured to its specifications with sales and service policies identical to other machine tools it manufactures domestically.

The Clearing-Harrison line of lathes ranges in size from 11 to 16 inches.

Stocks of lathes in all sizes, including 11, 13 and 16 inch swing lathes, will be on hand at all times. Spare parts and a complete line of accessories will be handled.

For more data circle 176 on Postpaid Card

★ modern machine shop ★

ADJUSTABLE CENTER

The Micro Set Adjustable Center is announced by Enco Mfg. Co., Dept. 139, 4520 West Fullerton, Chicago 39, Ill. Designed to permit quick, easy center alignment on old or new machines, the adjustable center eliminates guesswork and time-consuming tailstock jogging.

Corrective movement of the work held between the lathe headstock and the adjustable center is accomplished by an equally eccentric ground sleeve and arbor which, when assembled, complement each other and produce

GRAND
Manufacturers Since 1921

SHOP CADDY

LIFTS, MOVES ¼ TON
Cuts HANDLING, STORAGE!



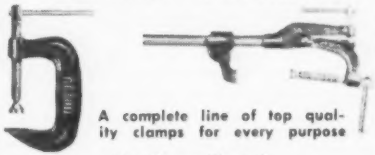
4 Speed Hydraulic Ram lifts 500 lb. load 36" high. Easy trucking even in cramped quarters.

$148.80

10 DAY FREE TRIAL BASIS

Distributors Wanted

GRAND CLAMPS



A complete line of top quality clamps for every purpose

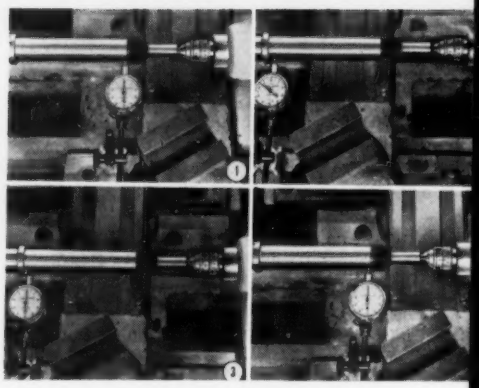
Distributors Wanted

ALLIED MFG. & SALES CO.
3101 W. Grand Ave.
Dept. M
Chicago 22, Ill.

For more data circle 570 on Postpaid Card

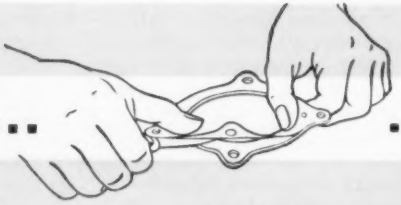
lateral movement of the ground and hardened tip in increments of 0.001 inch, which are read directly on the sleeve by the operator. Total tip movement in either direction is 0.006 inch.

The illustration shows the ease with which a pair of centers can be aligned for precise turning. Photos 1 and 2 show an indicator used to check alignment of centers on a workpiece which has already been turned. Photo 1 illustrates that the tailstock end of the workpiece is zeroed in. Moving the indicator to the left position, which is just one-half the total length of the workpiece, indicates that there is a minus 0.0015 inch taper between the tailstock end and the point shown. This means that if a cut were made, it would result in a 0.003 inch taper on the diameter for this length. The minus taper running toward the headstock indicates that the smaller diameter would be turned at the tailstock end. Therefore, the center point of the adjustable center should be moved to the rear (away from the operator) in



Micro Set Adjustable Centers in use

Our Superiority Here...



Our superiority in the production of Laminated Shims of LAMINUM results in profitable advantages for manufacturers of aircraft, missiles and rockets, motors and engines, machine tools and similar precision-assembled products. With LAMINUM, they cut costs and turn out better assemblies, to close-tolerance accuracy, with no need for grinding—counting—stacking—miking. LAMINUM simply p-e-e-l-s to size, with no dirt between layers—ever!

BRASS with laminations of .002" or .003"	**ALUMINUM** with laminations of .003" or NEW .002"
STAINLESS STEEL with laminations of .002" or .003"	**MILD STEEL** with laminations of .002" or .003"

LAMINUM®
the solid Shim that p-e-e-l-s for adjustment

Send for free brochure
"Engineering Data File"
...contains complete information.

THE LAMINATED SHIM COMPANY, INC. *Coast-to-coast Service in Aircraft*

For more data circle 571 on Postpaid Card

order to true up the workpiece. This is done by setting the adjustable center at the plus 6 mark (photo 3) which moves the tip to the rear 0.003 inch, providing the necessary correction, which is proven by moving the indicator to the position shown in photo 2 and noting that it is zeroed. Moving the indicator back to the tailstock end of the piece demonstrates that this end is also zeroed and the entire workpiece has been accurately centered, which will result in parallel turning of the workpiece.

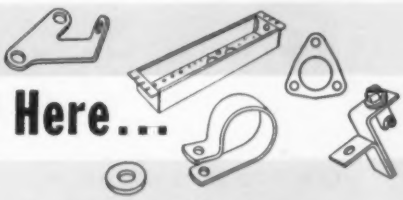
Normally, a trial cut would be taken on a workpiece, either half or one-quarter of its length and, by measuring the diameters at the distance turned with a micrometer, the total taper in the workpiece can be readily established. The adjustable center can then be moved to eliminate this taper, depending upon the direction it will run. If more stock is to be removed at the tailstock end, the center should be moved to the minus side and vice versa. This procedure can also be applied to taper turning. With very little experience, the operator can align his piece after the first cut.

For more data circle 177 on Postpaid Card

★ modern machine shop ★

ABRASIVE BELT GRINDER

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich., announces the Model 600-P Abrasive Belt Grinder. As a dry model, it is equipped with an exhaust outlet. Also, it can be equipped with a built-in dust collector. As a wet model, it has a sprayer, which provides a heavy lay of water on the belt and complete flooding of the work. The sprayer is adjustable to the work height. A curtain, attached to the sprayer, traps splash from the work and table. Work temperature is kept at a minimum. A



...Guarantees Superiority Here...

Actually, our Shims of LAMINUM are perfect precision STAMPINGS. Consequently, we have perfected our own special equipment, tooling, skills and techniques—all unknown to ordinary stamping shops. Result: the means to produce *your* precision STAMPINGS—in any contour, any size, any quantity "one to a million", at lowest possible cost. 3 exclusive Methods save you money...

Send for free booklet—"Service in Stampings".

METALLIC GASKETS • ELECTRONIC CHASSIS
WASHERS
STAMPINGS
BY LAMINATED SHIM CO. SPECIALISTS
SPACERS
CLAMPS • BRAZED AND BENCH ASSEMBLIES

Any one of these **3 METHODS** will economically produce Aircraft Quality Stampings—"one or a million"—to your detailed specifications:

1. MACHINE CUT METHOD for just a few pieces—at experimental or pilot stage. No dies needed. Special techniques and equipment keep costs down.

2. SHORT RUN METHOD. Use of low cost, short run tooling, plus special equipment produces more than "just a few." Quality stays high—and costs stay low.

3. PRODUCTION RUN METHOD. Here is where our special tooling applies to great advantage. When dies are needed, charges are moderate. Fast delivery at lowestpossiblecost.

Quality Shims and Stampings • **3305 UNION STREET, GLENBROOK, CONN.**

For more data circle 572 on Postpaid Card



Hammond Model 600-P Abrasive Belt Grinder

modern hood and large pan provide very effective spray and splash control.
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★ modern machine shop ★

CENTERLESS GRINDER

Van Norman Machine Co., Springfield 7, Mass., announces its 2C Diversimatic Centerless Grinder. It has been engineered to assure accurate, close

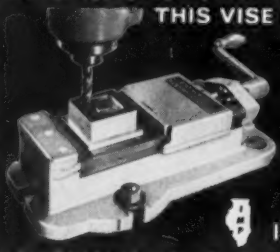


Van Norman 2C Diversimatic Grinder

tolerance grinding and to provide more work ability. This machine is a rugged, heavy duty unit which is said to give the work ability of three centerless grinders with a minimum of change-over time—for through feed work, in-feed work and it can be equipped with a crush forming attachment for profile work. The 2C can grind parts from solid, or finish grind rough turned parts. It is an ideal machine for grinding a great variety of parts made of metal, plastic, glass and so on. It is especially suited for grinding parts used in business and office machines, sewing machines, electrical appliances, aircraft, automobiles, munitions and similar work.

Following are some of the features of this Van Norman Machine: unit type constructed grinding and regulating wheel spindles; 24 inch grinding wheel that gives more pieces per dress; regulating wheel housing mounted on

THIS VISE CAN PAY FOR ITSELF IN 30 DAYS OR LESS



"IMP" HOLD DOWN vise with the spring-loaded hold-down jaws automatically seat the work flat. You need no skill, in fact, you can do more jobs—do them better—with an "IMP" Hold Down vise. See your dealer or write us and we'll tell you how. New low prices $142.50 to $175.50.

Send for the "IMP" Hold Down vise bulletin.

ILLINOIS METAL PRODUCTS

429 W. Superior St.
Chicago 10, Illinois

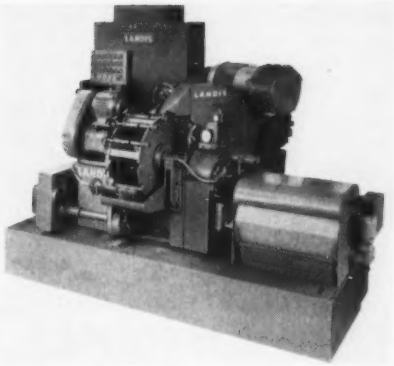
For more data circle 573 on Postpaid Card

dovetail ways for easy and positive lateral alignment with the grinding wheel; chrome plated regulating wheel slide; infinitely variable regulating wheel speeds; large, easy to read infeed dials graduated in 0.0001 inch increments with micrometer infeed size control; the Diversimatic 2C has been especially designed for crush form grinding.

For more data circle 179 on Postpaid Card

PLUNGE GRINDER

A completely new design production grinder has been developed by Landis Tool Co., Waynesboro, Pa. It is designated as the Landis R Plunge Grinder. This machine is designed for production infeed grinding cylindrical work with completely automatic operation, and is available with a straight or angular wheel head. A formed grinding wheel, or several grinding wheels, can be used. This makes it possible to grind a face and several diameters in one operation.



Landis Type R Plunge Grinding Machine

A box bed provides a rigid foundation for the machine. There is no swivel table or carriage, since the R Plunge Grinder is for infeed grinding

B.S.A. CHUCKS MEDIUM DUTY • PRECISION MADE IN ENGLAND

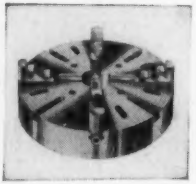


MODEL 580
Self - centering
Geared Scroll
UNIVERSAL •
Three Jaws

Includes 1 set External Jaws, 1 Key, 1 set Internal Jaws, 3 Pinions, 3 Bolts

IMMEDIATE DELIVERY

SIZE	WEIGHT (lbs.)	CHUCK BORE	PRICE
3″	3½	⅝″	$ 35.75
4″	8	1″	35.75
5″	12	1¼″	41.50
6″	17½	1 9/16″	48.00
7½″	29	2″	56.50
9″	42	2½″	71.50
10½″	62	3″	88.50
12″	88	3″	120.00
15″	143	3¼″	180.00
18″	200	4″	261.00
21″	262	4½″	320.00
24″	324	4½″	390.00



MODEL 550
4-JAW INDEPENDENT CHUCK

Includes 4 operating screws, 4 Reversible Jaws, 4 Bolts, 1 Key.

Order Today

SIZE	WEIGHT (lbs.)	CHUCK BORE	PRICE
4½″	8	1″	$ 30.50
6″	16	1 9/16″	35.00
8″	34	1¾″	51.00
10″	60	2″	62.50
12″	80	2¾″	74.50
14″	98	3″	84.00
16″	126	3″	105.00
18″	166	4″	140.00
20″	204	4″	165.00
22″	246	5″	205.00
24″	322	5″	220.00
30″	490	5½″	340.00

Dept. B, 251 Centre St.
NEW YORK 13, N. Y. CAnal 6-5575

VICTOR MACHINERY EXCHANGE, INC.
Dealers In Tool Room Equipment

For more data circle 574 on Postpaid Card

only. The headstock and footstock are mounted on columns, secured to the front of the bed. This design makes it possible to use an automatic rotary type loader, as shown in the illustration, or a chute type loader for handling workpieces. Hand loading can also be used. Coolant and hydraulic oil reservoirs, as well as all hydraulic control valves, are mounted away from the bed to minimize the possibility of heat from the units affecting machine alignments. They are also more accessible for preventive maintenance.

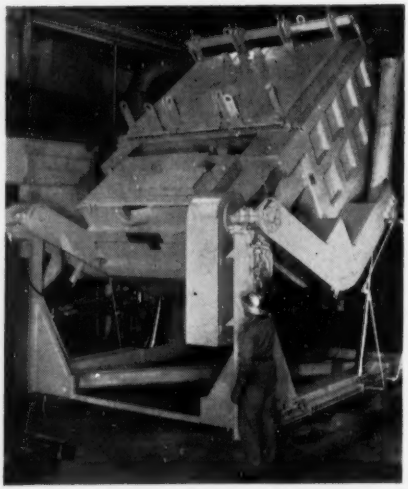
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★ modern machine shop ★

30,000 POUND FURNACE

A 30,000 pound, aluminum induction holding furnace, with a three-section hydraulically operated cover, is offered by the Melting Furnace Division, Lindberg Eng. Co., 2444 West Hubbard St., Chicago 12, Ill. The heavy duty unit is ruggedly constructed for continuous service. Shell is mounted on heavy duty bearing trunnions and supported on heavy structural steel legs. Chamber lining is of monolithic construction and is nonwettable to aluminum. Tilting mechanism is engineered to give positive, safe, fingertip control.

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Lindberg Furnace has 30,000 pound capacity

JIG GRINDING and JIG BORING

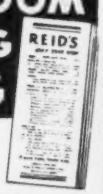
to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

A. K. TOOL CO., INC.
ROUTE 22, MOUNTAINSIDE, N. J.
Telephone: ADams 2-7300

For more data circle 575 on Postpaid Card

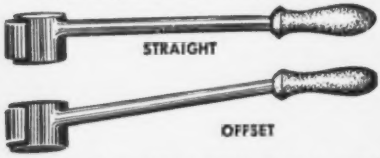
Every **TOOL ROOM NEEDS THIS BIG REID CATALOG**



It's Free!

Send for this new 78 page catalog describing scores of needed tool room accessories and components

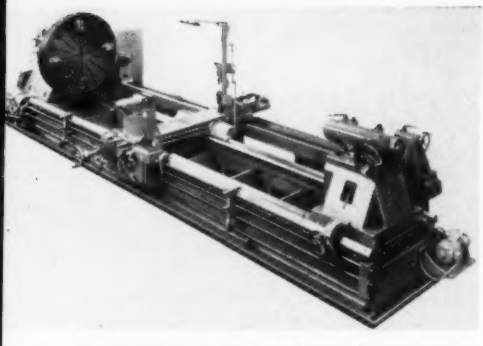
MALLEABLE MACHINE HANDLES



Finest and most complete available. Made in straight and offest types as shown. Also in crank type. Made in many sizes. Well proportioned. Neat in appearance. For severe usage. Low prices.

REID TOOL SUPPLY CO.
MUSKEGON HEIGHTS, MICHIGAN

For more data circle 576 on Postpaid Card



Shown above is Sidney "Space-Master" Lathe

LATHES

Designed for the rocket, missile and allied fields, as well as for use on other large parts requiring precision, the "Space-Master" series announced by Sidney Machine Tool Co., Sidney, Ohio, is available in swings up to 72 inches and center distances ranging up to 50 feet. Incorporating a high degree of versatility, this lathe series is available with or without the fluid tracer. It embodies numerous features designed to insure precision, smoothness of operation and versatility.

Among the features is a 16 spindle speed headstock with lapped herringbone gears. This type of gearing provides for smooth operation, greater tooth contact, balanced gear loads and long gear life. Headstock bearings are precision taper roller type.

For thread and feed changes 60 ratios are standard. For infinitely variable speeds, the Space-Masters are available also with d.c. motor drive.

A power operated rapid traverse has multiple screw supports and operates in a totally enclosed housing. A safety clutch prevents damage, if the carriage should run into an obstruction.

The fluid tracer may be equipped with periscope mirror.

For more data circle 182 on Postpaid Card

Mahr

50 Millionths Reading

SELF-CENTERING

BORE GAGES

Check bores for size, out-of-round and taper in any spot and to any depth within range of instrument to an absolutely reliable accuracy of

50 MILLIONTHS of an inch

THIS HIGH PRECISION INSTRUMENT IS AN INEXPENSIVE, ACCURATE AND DEPENDABLE **INTERNAL COMPARATOR**





FINE ADJUSTMENT

ADJUSTABLE LIMIT HANDS

Small Bore Gages

RANGE .060" TO .160" PRICE **$126.00**
Complete in Hardwood Case

RANGE .160" TO .280" PRICE **$110.00**
Complete in Hardwood Case

OTHER SIZES UP TO 10"

GUARANTEED Mahr QUALITY

IF NOT AVAILABLE AT YOUR FAVORITE SUPPLY HOUSE - WRITE TO US FOR ILLUSTRATED FOLDER.

MEASURING HEADS ARE HARDCHROME PLATED FOR MAXIMUM WEAR

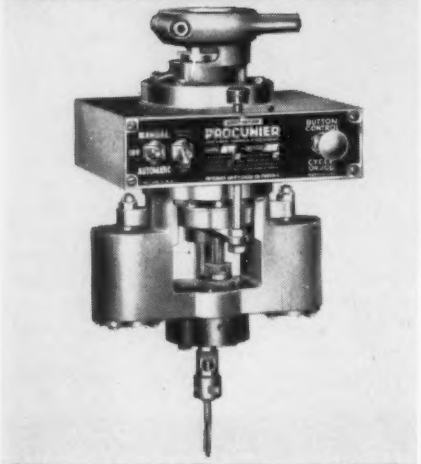
MAHR GAGE CO., INC.

274-MO LAFAYETTE ST. • NEW YORK 12, N.Y.

HEADQUARTERS FOR PRECISION MEASURING INSTRUMENTS AND FINE TOOLS

For more data circle 577 on Postpaid Card

TAP GAUGE PERFECT PARTS *Everytime!*



New Lead Screw Tapper

with Finger Tip Push Button Controls permits you to tap any quantity of practically any material, with absolute precision, without rejects, without stripped threads or distortion. Tests have shown it produces parts that pass 100% inspection—100% acceptable! The secret is in the tap control mechanism which feeds the tap automatically without any pressure. The Lead Screw controls the tap and guides it steadily through each cycle, guaranteeing supreme accuracy.

In addition, it offers convenient 5-way operation; pushbutton and foot control for complete cycle or jog automatic (without foot or hand controls) or with switch fixture for full cycle. Either way, you get uniformity, speed and precision that's unparalleled!

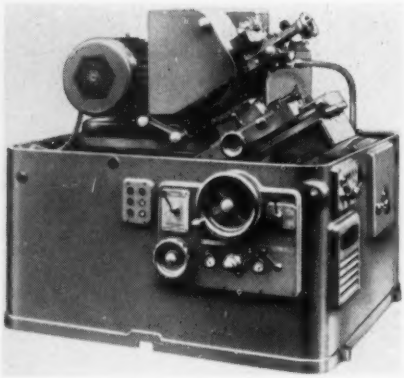
FREE BROCHURES

on the new lead screw push button unit and complete Procunier Tapping Head line are yours FREE. Write today!



PROCUNIER
SAFETY CHUCK CO.
12 S. Clinton St., Dept. 5, Chicago 6, Ill.
For more data circle 578 on Postpaid Card

new shop equipment . . .



Reishauer BS Thread Chaser Grinder

THREAD CHASER GRINDER

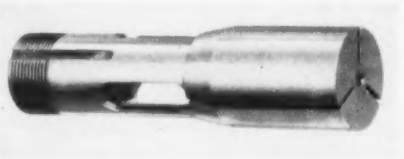
The Reishauer BS Thread Chaser Grinding Machine is introduced by Cosa Corp., 405 Lexington Ave., New York 17, N. Y. The Reishauer BS is specially designed for grinding all types of flat threads and grooved profiles, such as those found on chaser dies, flat rolling dies and racks. The rigid construction guarantees extremely accurate profiles and excellent surface finish and makes it particularly suitable for mass production.

For more data circle 183 on Postpaid Card

★ modern machine shop ★

EXPANDING COLLETS

To fill a need for a satisfactory collet for internal holding operations,



The Wade Expanding Collet is shown above

DORMAC • MILL-MATIC DIAL TYPE
High Speed Universal Milling Machines



ACCURATE • DURABLE
EASY TO OPERATE

- National Standard Taper
- High Speed - Dial Type
- Power feed in all directions
- Hardened and ground gears
- Power rapid traverse in all directions
- Chrome Nickel Spindle
- Made in Table Sizes: 48″ x 11″ to 60″ x 12″

MILL-MATIC -48"x11" Table Size...
DORMAC -60"x12" Table Size...

PRICES INCLUDE ALL STANDARD EQUIPMENT:

1 Main Motor — 1 Feed Motor — 1 Motorized Coolant System — 1 Arbor — 1 Brace — 2 Arbor Supports — 1 Draw-in Bolt — V-Belts — Climb Milling Arrangement — Set of Wrenches.

DEALER INQUIRIES INVITED

INDEX INDUSTRIAL CORPORATION

150-MM BROADWAY • NEW YORK 38, N. Y. • BEekman 3-4540

For more data circle 579 on Postpaid Card

two types of expanding collets have been developed by The Wade Tool Co., 75 River St., Waltham 54, Mass., both actuated by a ball bearing-lever collet closer.

One model (8U-155) is of one piece construction and is said to hold a workpiece as small as ⅛ inch in diameter. A big advantage claimed for it is that steps can be turned on it, to suit various internal diameters; or, after finishing one job, it can be used again by turning down to a smaller diameter. A collar can be furnished to hold accurate shoulder dimensions.

Model 8U-165 makes use of interchangeable expanding collets for different sizes, and provision is made for truing up the collets, if necessary, when they are changed. This model will take somewhat larger work than the

WILLEY'S Pentagon

UNCONDITIONALLY GUARANTEED

to out-perform any other style of carbide throw-away insert—for straight turning, boring, or facing applications—on any kind of material.

solid carbide



indexable insert





The pentagon is a cam ground, radii tangent, indexable insert of solid carbide. It presents **10 cutting edges** at a 30° lead angle and each edge will produce more finished work than the edge of any other standard insert.

Not on tests alone—but in actual production; on various operations; machining all types of materials — Willey's Pentagon more than doubled the best performance of all other inserts tried. It is proven superior . . . **we guarantee it.**

Try the pentagon! You'll save money. You'll do a better job — faster, and once used you'll never go back to fragile . . . high-cost . . . yesterday's tooling.

A complete catalog of Willey's carbide tool products is available on request.



Send your part print and present tool layout for prompt quotation

WILLEY'S CARBIDE TOOL CO.

1340 W. Vernor highway • Detroit 1, Michigan • Telephone: WOodward 1-9444

For more data circle 592 on Postpaid Card

Exceptional Values! Available from stock!

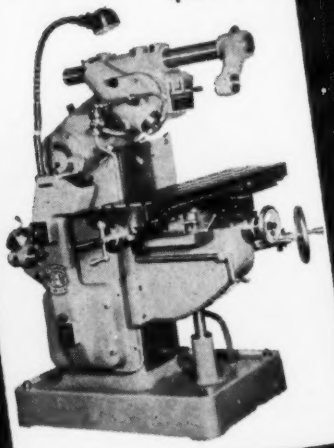
PRECISION MILLING MACHINES

THOUSANDS SOLD TO SATISFIED CUSTOMERS!

ABENE

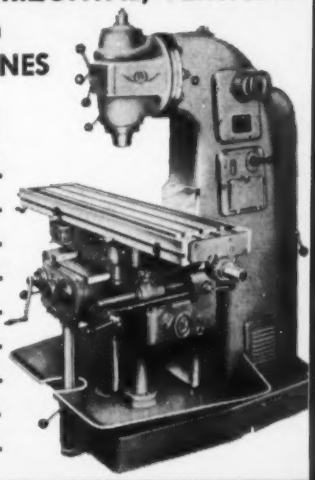
VERTICAL HORIZONTAL MILLING MACHINE

$3990.



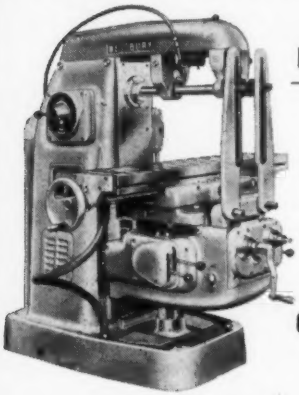
PEDERSEN HORIZONTAL, VERTICAL and combination MILLING MACHINES

Model	Table Size in Inches	Base Price
VPF-00	35½x8¾	$1663.
VPV-00	35½x8¾	$2463.
VPU-0	39½x9½	$2890.
VPU-1	51x12	$3260.
VPV-1	51x12	$3760.
VPF-2	61x12	$6185.
VPU-2	61x2	$6285.
VPV-2	61x12	$6885.
VPF-4	75x16	$12850.



LIBERAL TERMS • RENTALS

WESTBURY Universal Dial-Type Horizontal Milling Machines



Model	Table Size in inches	Base Price
1U	40x10	$3390.
2U	51¾x10⅜	$5265.
3U	60x12¼	$6275.
1-S	42x9	$1690.
Contour	42x9	$3190.

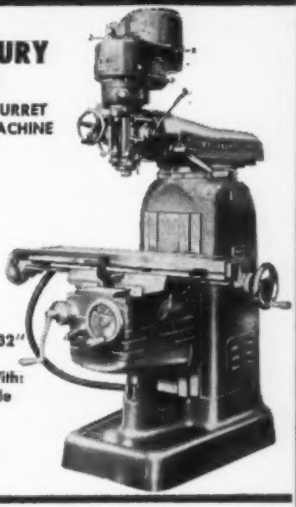
AGENTS WANTED

WESTBURY I-S

VERTICAL TURRET MILLING MACHINE

$1595

Incl. Motor & Controls



1½ H.P. 9"x32" Table

Available With:
9"x42" Table $95. extra
Coolant $135. extra

AARON MACHINERY CO., Inc.

DEPT. M 45 CROSBY ST., N. Y. 12 • WA 5-8300

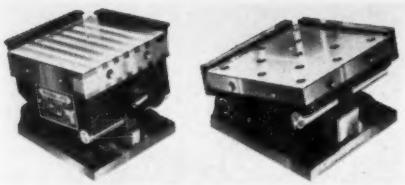
BRANCHES AT:
BUFFALO, N. Y. RICHMOND, CAL.
MINEOLA, N. Y. LOS ANGELES, CAL.
HOUSTON, TEXAS

SEE OTHER AD ON PAGE 275

For more data circle 580 on Postpaid Card

8U-155 and will hold exact shoulder lengths. It can be used only on lathes having the American Standard Spindle Nose.

For more data circle 184 on Postpaid Card



(Left) Magna-Sine and (right) Sine Plate

SINE PLATES

The Omer E. Robbins Co., 11961 Dixie Ave., Detroit 39, Mich., announces a small size in magnetic (Magna-Sine) and non-magnetic sine plates. These smaller size sine plates have a 4 by 4 inch working area and provide all the time-saving, accurate angular setup features found in larger Robbins equipment.

The Magna-Sine table has a strong, fine pole, permanent magnet chuck that firmly holds small work without distortion. The non-magnetic sine plate table has a ground surface and tapped holes for convenient clamping of work. These two sine plate models permit rapid angular setup of small to medium size work for grinding or inspection operations.

While these sine plates are designed for single angle setups, compound angles can also be quickly set up by combining either two Magna-Sines, a Magna-Sine with a sine plate or two Sine Plates.

For more data circle 185 on Postpaid Card

There's more than luck to

CLOVER COATED ABRASIVES . . .

The man who has used Clover Abrasives for years is apt to believe in luck. *He is lucky* that he has been introduced to Clover products. But that kind of good fortune is built in when the product is made. Part of it rests in our discriminating choice of the best materials available; the other part in the care real craftsmen use in making a tool.

Fifty-odd years of experience have proven many times that Clover Coated Abrasives are a lucky choice because they are made for hard service. Ask your Clover Distributor for samples or for a new Clover Catalog, or write us direct. You owe it to yourself to see the Clover line.

Clover Manufacturing Company

Norwalk, Connecticut

Victor 7-4515

Makers of the famous

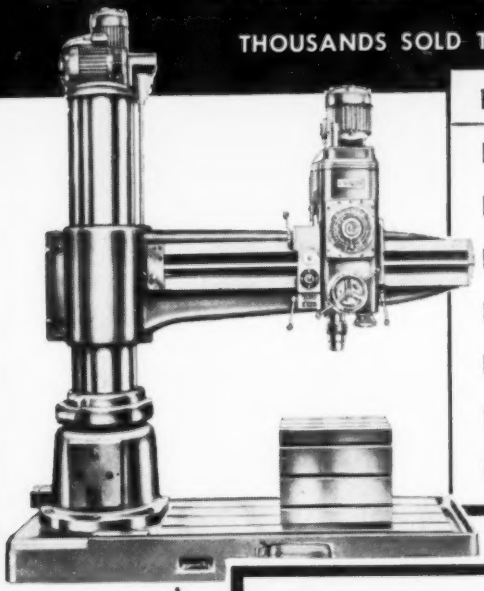
CLOVER Grinding and Lapping **COMPOUNDS**

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UNBELIEVABLE VALUES!...

IMPERIAL RADIAL DRILLS

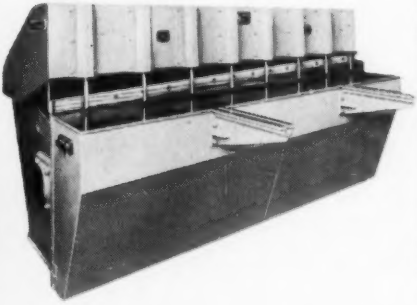
THOUSANDS SOLD TO SATISFIED CUSTOMERS!



Model	Col. Diam. Inches	Arm	Base Price
L-26	7½	26″	$1995.
L-2½	8½	2½′	$2085.
L-3	8¼	3′	$2195.
M-3PE	10	3′	$3995.
M-4PE	12⅜	4′	$4985.
M-5PE	14	5′	$6295.
M-6PE	14	6′	$6985.

AGENTS WANTED

IMPERIAL WIEGER Guillotine Shears



- ALL STEEL CONSTRUCTION
- SINGLE STROKE CONTROL
- PERMANENT ACCURACY

8″ gaps on all models. Cuts thin and heavy gauge accurately.

Length	Capacity	Price
6′	10 gauge	$3595.
8′	12 gauge	$4395.
10′	12 gauge	$5195.
6′	3/16 inch	$5190.
8′	10 gauge	$5495.
10′	10 gauge	$5795.
6′	7/32 inch	$6190.
8′	3/16 inch	$6495.
10′	3/16 inch	$6795.

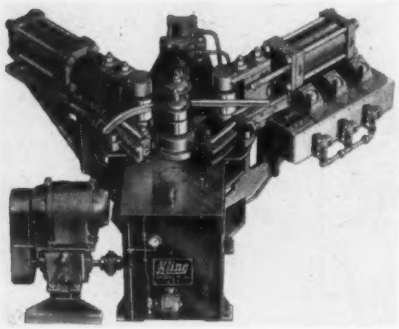
AARON MACHINERY CO., Inc.

DEPT. M 45 CROSBY ST., N. Y. 12 • WA 5-8300

BRANCHES AT:
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MINEOLA, N. Y. LOS ANGELES, CAL.
HOUSTON, TEXAS

SEE OTHER AD ON PAGE 273

For more data circle 581 on Postpaid Card



Kling Hydraulic Double Pinch Angle Roll

HYDRAULIC DOUBLE PINCH ANGLE ROLL

Kling Brothers Eng. Works, 1320-32 North Kostner Ave., Chicago 51, Ill., has developed a horizontal hydraulic double pinch type angle and structural bending roll. Its unique action permits elimination of 90 percent of the flat ends which are otherwise unavoidable in angle bending. An operator may literally bend a steel section completely around the center roll.

Hydraulic pressure provides tremendous bending force and, at the same time, assures maximum flexibility and ease of control. Construction features the movement of pinch rolls and gauging roll by means of heavy duty hydraulic cylinders. Control levers actuate leakproof pressure flow valves. This arrangement gives the operator instant response and extremely sensitive control of the rolling operation at all times.

A two stage "high-low" pressure pump enables the rolls to be brought into operation quickly and, upon contact with the work, develops full working pressure immediately. The cone type worm gear drive is mounted on anti-friction bearings.

For more data circle 186 on Postpaid Card

OPTICAL MEASURING SYSTEM FOR HORIZONTAL BORING MILLS

An optical measuring system for horizontal boring, milling and drilling machines is announced by The Cincinnat Gilbert Machine Tool Co., Cincinnati 23, Ohio. The Gilbert Tele-Vernier is an optical projection device. It is designed to increase the accuracy and speed of reading vernier scales for vertical and horizontal movements of a boring mill.

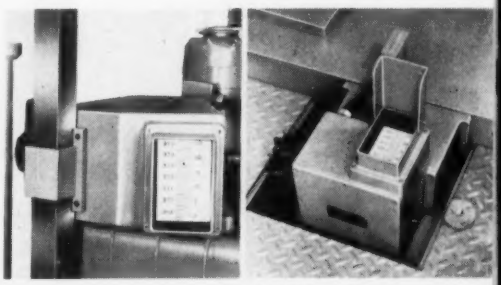
The image of the long stainless steel scale, graduated to 1/40 inch, is projected on a ground glass about 3 by 5 inches. Vernier scale is etched on the screen and has 25 graduations. About 0.6 inch of scale is projected.

This large screen image enables the operator to read the Tele-Vernier quickly and accurately. It also eliminates errors caused by parallax.

The Tele-Verniers are controlled from the pendant station on Cincinnati Gilbert Boring Mills. Each control includes a pushbutton for illuminating the screen. This button starts a timer which automatically turns off the lamp after a short interval, preserving the life of the bulb.

Each Tele-Vernier control includes two buttons which adjust the vernier for starting position, so the operator can start at a convenient reading of the system.

For more data circle 187 on Postpaid Card



The Gilbert Optical Measuring System

Example
Model S8S



16" Swing, 8 H.P.
40" Centers
$5,495
F.O.B.
Larchmont, N. Y.

Weight	4800 lbs.
Spindle Speeds	18
Feeds & Threads	76
Spindle Bore	2⅜"

Flame Hardened Bedways Optional

Superb
Swedish
Engineering

KOPING LATHES

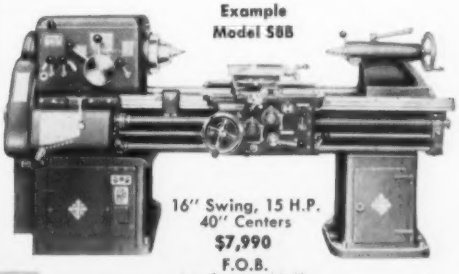
Realistically
Priced
Heavy Duty
Large Spindle Bore
Swings From 16" to 60"

For years successful manufacturers have turned out better products with KOPING Machine Tools, which owe so much to the outstanding Swedish materials from which they are made. They know that the KOPING nameplate is not just another trademark, but is also a criterion of quality, top design and good service. KOPING has been making machine tools for more than 100 years. This continuity of service is our inspiration today as we build a bigger future for KOPING products.

Weight	6100 lbs.
Spindle Speeds	18
Feeds & Threads	271
Spindle Bore	2⅜"

Flame Hardened Bedways Standard

Example
Model S8B



16" Swing, 15 H.P.
40" Centers
$7,990
F.O.B.
Larchmont, N. Y.

MEKANISKA
VERKSTADS AB
KOPING • SWEDEN

Homestrand, inc.
Our representative in USA:
9 ADDISON STREET, LARCHMONT, NEW YORK

VOLVO
Another member of
the VOLVO Family

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where to get it

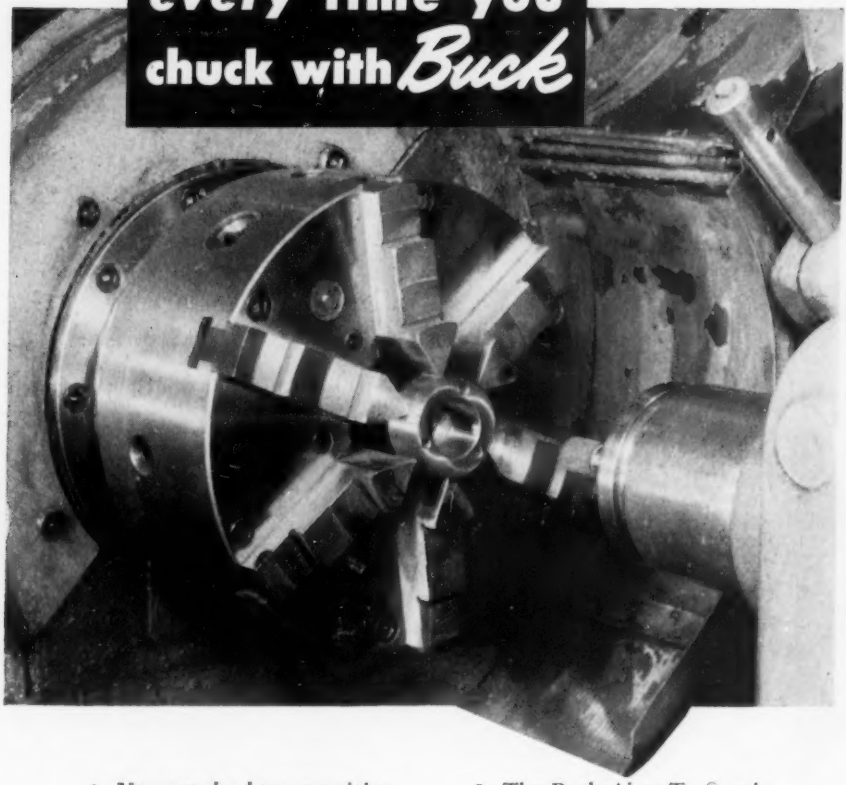
Numbers shown are the page numbers of advertisements and new equipment write-ups which appear in this issue.

Abrasives, Grain, Cloth, Paper, Disc, etc., 28, 50, 61, 66, 67, 87, 274
Actuators, 160
Adapters, 33, 168, 176
Agitators, 287
Air Operated Equipment (Look for specific item)
Alloys, Inside Front Cover, 9, 22, 32, 38, 147, 175, 178, 227, 229, 237
Amplifiers, 185
Angle Irons, 215
Angles, 215, 223
Arbors, 33
Assembling Machines, 248
Automated Equipment (Look for specific item)
Awls, 201

Bags, Shipping, 201
Balancing Ways, 165
Bar Machines, Automatic, 44, 45, 70
Bar Stock, 178
Bars, Aluminum, 76
Bars, Finishing, 252
Bearings, Bronze, 76
Bearings, Roller, 247
Bearings, Thrust, 76
Benches, Work, 254
Bending Devices, 246
Bending Machines, 54, 72, 256
Blades, Cutting-Off, 9, 28, 137, 157
Blades, Shear, 84, 157
Blocks, Step, 177
Blocks, V, 215
Bolts, 177, 203
Boosters, 167
Boring Bars, 55
Boring Heads, 215
Boring Machines, 46, 245
Boring Mills, Horizontal, 47
Brackets, 168
Brakes, Press and Bending, 30, 214, 229
Broaches, 64
Broaching Kits, 64
Bronze Bars, 76
Brushes, 58
Brushing Machines, 58
Buffers, Bench and Pedestal, 136
Burners, 185
Burnishing Machines, 261
Burs, 147
Bushings, Brass, Bronze, etc., 76
Bushings, Drill Jig, 55, 65, 85, 160, 239
Bushings, Pilot, 239
Bushings, Sleeve, 105
Bushings, Tap, 228

Calibrating Devices, 226
Calipers, 242, 255
Cam Making Machines, 205
Cams, 205, 239, 247, 252
Carbides, Inside Front Cover, 9, 92, 192
Centers, Lathe, Planer, Miller, etc., 91, 201, 208, 263
Chamfering Machines, 54
Charts, Trigonometry, 103
Chisels, 191
Chucks, Boring, 55
Chucks, Collet, 55, 168
Chucks, Diaphragm, 216
Chucks, Floating, 55
Chucks, Power, 279
Chucks, Scroll, 279
Chucks, Universal, 267
Circulators, 287
Clamping Fixtures, Magnetic, 29
Clamps, 33, 107, 177, 190, 196, 228, 263, 281
Cleansers, Hand, 155
Clinching Machines, 69
Collectors, Mist, 171, 218
Collet Closers, 234
Collets, 105, 246, 270
Comparators, 46, 260
Control Systems, 168
Controlling Devices, 235, 240

YOU make money every time you chuck with *Buck*



1. You get *dead true* precision chucking single parts—.0005″ precision on duplicate parts. (Conventional chucks are only accurate to .003″ *when new.*)

2. You save costly machinists' time. Takes but a minute to indicate and adjust a Buck. No fooling around with shims.

3. The Buck Ajust-Tru® principle helps compensate for spindle run-out, compensates for chuck wear—greatly lengthens chuck life.

Buck Ajust-Tru 3- and 6-jaw chucks cost no more than conventional chucks. Send for catalog—see for yourself why "It pays to chuck with Buck."

Makers of Scroll, Power, Dust Proof, Independent Chucks.

BUCK TOOL COMPANY

514 SCHIPPERS LANE • KALAMAZOO, MICH.

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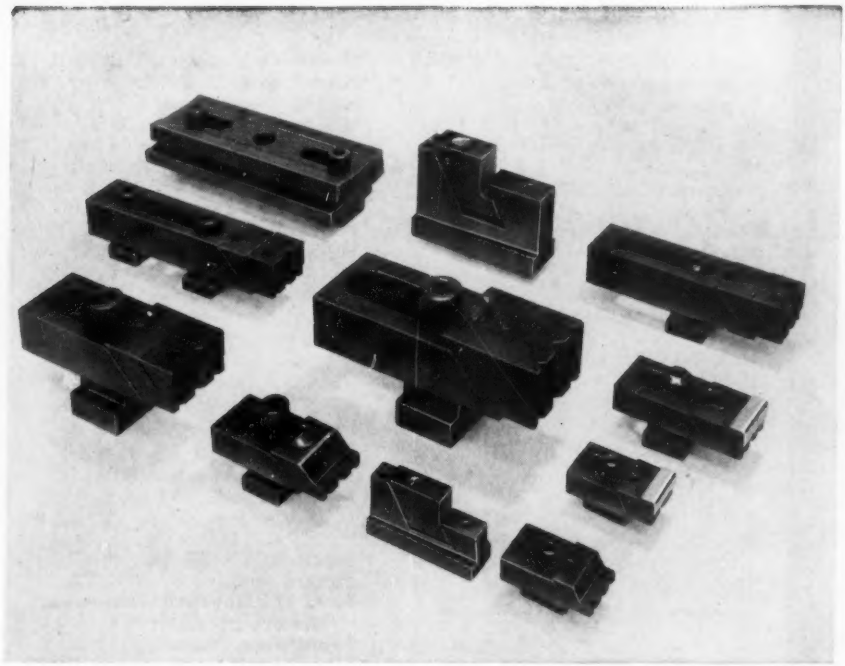
Coolant Separators, 159
Coolant Units and Systems, 222, 236
Coolants, 170, 196
Counterbores, 88, 225
Countersinks, 157, 234, 238
Cut-Off Machines, 34, 35, 89, 189, 192
Cutters, Gear, 143
Cutters, Hole, 201, 246
Cutters, Inserted Blade and Tooth, 143
Cutters, Milling, 9, 48, 143, 289
Cutters, Rod, 169
Cutting Compounds, 170
Cylinders, Hydraulic and Pneumatic, 69

Deburring Machines, 54
Diamond Wheels, 164
Die Heads, 4
Die Lifting and Handling Machines, 195, 238
Dies, Punching or Forming, Inside Front Cover, 18, 39, 88, 94, 142, 203, 214, 241
Dividing Heads, 181
Dressers, Grinding Wheel, 163
Dressing Fixtures, Grinding Wheel, 33, 184, 205, 212, 251, 281
Drill Heads, 141, 151, 202, 212, 217, 235
Drill Jigs, 91
Drill Rod, 175
Drilling Attachments, 218
Drilling Machines, Bench, 43
Drilling Machines, Horizontal, 223
Drilling Machines, Multiple Spindle, 34, 35, 43
Drilling Machines, Radial, 36, 37, 81, 100, 244, 275
Drilling Machines, Sensitive, 34, 35, 36, 37
Drilling Machines, Vertical, 34, 35, 36, 37, 43, 74, 208
Drilling and Tapping Units, Combination, 151, 188
Drilling Units, 132, 151
Drills, Center, Core, Twist, etc., 63, 88, 143, 154, 157, 176, 185, 196, 205, 248
Drivers Tool, 168
Drives, Lathe, 21
Dust Control Equipment, 171, 214, 262

Electrolytic Machining Equipment, 217
End Mills, 71, 88, 143, 153, 248
Engraving Machines, 68, 181, 289
Extensions, 168, 204, 207
Facing Heads, 77, 209, 233
Feed Units, 80, 105, 210
Files, 147
Files, Oilstone, 50
Files, Rotary, 250
Finishing Machines, 220
Fittings, 42
Flexible Shaft Equipment, 151
Forgings, 178
Forming Machines, 96, 214, 259
Furnaces, Heat Treating, 185, 203, 261, 268, 291

Gage Accessories, 99
Gages, 99, 142, 160, 168, 190, 213, 255, 257, 269
Gas Cutting Apparatus and Supplies, 211
Gear Cutting Machines, 16, 17
Generators, 194
Grinders, Abrasive Band and Belt, 5, 34, 35, 265
Grinders, Bench, 5, 34, 35, 136
Grinders, Centerless, 10, 11, 266
Grinders, Center Type, 10, 11
Grinders, Chip Breaker, 34, 35
Grinders, Chucking, 10, 11
Grinders, Cutter and Tool, 34, 35, 68, 219
Grinders, Cylindrical, 50, 61, 267
Grinders, Die and Mold, 226, 231
Grinders, Drill, 13, 151, 219
Grinders, Hand, 151, 189
Grinders, Hydraulic, 10, 11, 56
Grinders, Jig, 36, 37, 197
Grinders, Pedestal, 34, 35, 136
Grinders, Profile, 46, 237
Grinders, Roll, 10, 11
Grinders, Surface, 7, 12, 24, 34, 35, 40, 82, 84, 98, 149, 229
Grinders, Tap, 251
Grinders Thread, 46, 56
Grinders, Thead Chaser, 270
Grinders, Universal, 49, 56
Grinders, Vertical, 49
Grinding Compounds, 206, 274
Grinding Fixtures and Attachments, 191, 236
Grinding and Polishing Machines, Combination, 84
Grinding Wheels, 28, 41, 50, 61, 66, 67, 82
Guns, Air, 224

Hammer Molds, 207
Hammers, Hand, 147, 229
Hand Tools, Power
(Look for specific item)



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DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of 2½ tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the 45° angle inward and downward movement of the jaw clamp is easily applied and controlled.

Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems — no interference with measuring tool readings.

See your industrial distributor or write today for free literature.

WHEEL DRESSERS · J&S TOOL CO. INC. · JAW CLAMPS · PRECISION VISES · DOWN-HOLDING DEVICES **CLAMPCUT** · SINE BARS ·

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For more data circle 584 on Postpaid Card

Handles, Hammer, 207
Handles, Machine, 249, 268
Handwheels, 249
Hardening Compounds, 241, 257
Hardness Testing Devices, 173, 185
Hinges, 234
Hobbers, Gear, 16, 17
Hobs, 88, 143
Holders, Blade, 137
Holders, Floating, 168
Holders, Insert, 199
Holders, Stylus, 95
Holders, Tool, Front Cover, 8, 9, 55, 91, 199, 205, 230
Holders, Work, 181
Honing Machines, 187
Hose Assemblies, Coolant, 205
Hydraulic Equipment
(Look for specific item)

Indicators, 250
Inhibitors, 97
Intraform Machines, 186

Jaws, Chuck, 105
Jig and Fixture Components, 177
Jig Borers, 36, 37, 83, 197, 233

Keys, Machine, 252
Keys, Woodruff, 252
Keyway Cutting Machines, 216, 262
Knives, 84, 157
Knobs, Hand, 177, 249

Lapping Compounds, 274
Lapping Machines, 10, 11, 220, 261
Lathes, Automatic, 14, 46
Lathes, Bench, 193
Lathes, Engine and Toolroom, 13, 19, 25, 34, 35, 39, 52, 53, 90, 100, 193, 263, 269, 277
Lathes, Turret, 6, 46, 246
Layout Materials, 227
Levers, 249
Lifting Machinery, 198, 263
Locking Devices, Jig and Fixture, 169
Lubricants, 170, 183
Lubricating Systems, 231

Magnifiers, 213, 225
Marking Devices, 78, 86, 228, 230, 239, 241, 253, 259
Measuring Systems, Optical, 276
Measuring Machines, Universal, 197
Microscopes, 31, 254
Milling Attachments, 197
Milling Machines, Bench, 207
Milling Machines, Double Head, 257
Milling Machines, Horizontal, 27, 207, 273
Milling Machines, Universal, 27, 271
Milling Machines, Vertical, 273
Mills, Midget, 231
Mounted Wheels and Points, 290
Mountings, Machine, 174

Name Plates, 68
Nibblers, 18, 169, 243
Notching Units, 179
Nuts, 177
Nuts, T, 177

Packaging Machines, 260
Pads, Collet, 105
Pads, Vise Jaw, 221
Pans, Tote, 158
Parallels, 215, 223, 255
Parters, Rod, 133
Parts, Machine Tool, Production, Aircraft, etc., 76, 160
Penetrators, Diamond, 173
Pins, Dowel, Taper, etc., 55, 194, 240, 252
Planers, 209
Plates, Angle, 197, 199
Plates, Sine, 274
Plates, Surface, 160, 215, 223
Pliers, 196
Power Units, Hydraulic and Pneumatic, 160
Presses, Arbor, 209
Presses, Hydraulic, 62, 165, 209
Presses, Power, 39, 140, 204, 236, 243, 249, 258, 283
Presses, Punch, 200, 202, 204, 243
Presses, Straightening, 165
Pumps, Coolant and Lubricant, 236, 287
Pumps, Molten Metal, 287
Punches, 18, 169, 191, 201, 203, 232, 241, 249

Quills, 151, 232

Racks, Machine, 252
Reamers, 88, 143, 157
Reels, 221

NOW...index tables

FOR MORE
ECONOMICAL
PRODUCTION
ON THESE NEW

HANNIFIN

"FD" PRESSES



Heavy-duty open-gap production presses with Hannifin hydraulic index tables...

Available in all of these sizes:

2, 3, 4, 5 and 6-ton bench models
6, 8, 10, 12 and 15-ton floor models

WITH THESE FEATURES...

Dual Safety Hand Lever Controls
Dual Electric Push-Button Controls
Adjustable Stroke Control
Reverse on Pressure or Distance
Full Automatic Cycling
Hannifin High Speed Hydraulic Index Tables
Reciprocating Hydraulic Slide Feeds

USE THEM FOR...

Assembly Operations
Riveting – Staking
Forming – Stamping
Trimming Die Castings
Trimming Plastics
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Call in your nearby Hannifin man—he's a trained production analyst —to prove how you can do more at lower cost with Hannifin presses. Or, write for our new Bulletin 132. It tells the whole story.

HANNIFIN COMPANY

565 South Wolf Road • Des Plaines, Illinois

A DIVISION OF PARKER-HANNIFIN CORPORATION

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where to get it . . . *(Numbers shown are page numbers in this issue)*

Refractories, 50, 61, 210
Rests, Compound, Steady, Tool, etc., 68, 222
Rings, Truing, 91
Riveting Machines, 69, 233, 247
Roll Handlers, 190
Rolling Machines, 276
Rolls, 229

Sanders, Portable Pneumatic, 206
Saw Blades, Band, 20, 79, 93, 147, 229
Saw Blades, Hack, 79, 147, 229
Saw Blades, Hole, 229
Saw Blades, Power, 79, 229
Saw Blades, Slitting, 157
Saw Frames, Hack, 79
Saw Sharpening Machines, 184
Sawing and Filing Machines, Combination, 26
Sawing Machines, Band, 20, 34, 35, 75, 180, 209, 228
Sawing Machines, Circular, 209
Sawing Machines, Hack, 229
Scrapers, Power and Hand, 165
Screw Drivers, Portable Pneumatic, 225
Screw Machines, Hand, 34, 35
Screws, Cap, Set, Socket, and Machine, 177, 203, Back Cover
Screws, Thread-Cutting, 239
Screws, Transfer, 245, 247
Segments, Grinding, 82
Separators, Magnetic, 159
Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 14, 25, 48, 199, 205, 207, 220, 233, 239, 241, 242, 247, 248, 252, 262, 268
Shapers, 30, 51, 59, 193
Shaping Attachments, 242
Shearing Attachments, 84
Shearing Machines, 30, 251, 275, Inside Back Cover
Shears, Hand, 207
Shims, 264, 265
Sine Bar Fixtures, 33, 281
Slitting Machines, 96
Spacers, 219
Spindles: Grinding, Boring, Milling, etc., 23, 160, 168, 292
Spring Winders, 161
Springs, 172
Squares, 215
Stampings, Pressed Metal, 265
Stands, Polishing, 57
Steel, Die, 22
Steel, Stainless, 38
Steel Stock, Ground Flat, 22, 147, 175, 229, 237
Steel, Tool, 32, 175, 227
Straightedges, 215, 223
Stud Sets, 177
Studs, 177, 203

Tables, Elevating, 215, 238
Tables, Rotary and Index, 68, 181, 197, 250
Tap Guides, 224
Tapes, Pressure Sensitive, 50, 61
Tappers, Automatic, 235
Tappers, Hand, 184
Tapping Attachments, 206, 212
Tapping Compounds, 240
Tapping Heads, 141, 202, 212, 217, 270
Tapping Machines, 4, 84, 252
Taps, 88, 142
Thread Rollers, 4
Threading Attachments, 4
Threading Machines, 4
Tool Bits, 8, 9
Tool Blanks, 9
Tool Posts, 199
Tools, Alloy-Tipped, 9
Tools, Boring, 9
Tools, Burnishing, 15
Tools, Carbide, Inside Front Cover, 9, 48, 63, 71, 88, 143, 157, 231, 241, 248, 250, 272, 289
Tools, Cutting-Off, Front Cover, 9, 73, 160
Tools, Facing, 9
Tools, Radius, 158
Tools, Recessing, 168
Tools, Relieving, 223
Tools, Special Cutting, 73, 191
Tools, Threading, 46
Tools, Turning, 9
Tracers, Lathe, 235, 243, 285
Tube Mills, 96
Tubing, 42, 249
Turning Attachments, Radius, 245
Turrets, Lathe, Tool Post, Bed and Tailstock, 211

Valves, 60, 210
Vise Jaws and Stops, 227
Vises, Bench and Machine, 33, 55, 91, 169, 197, 266, 281

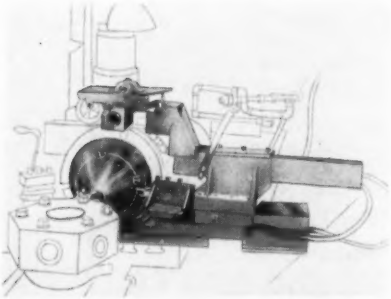
Washers, 177
Wear Parts, Inside Front Cover
Welding Equipment and Supplies, 224, 255



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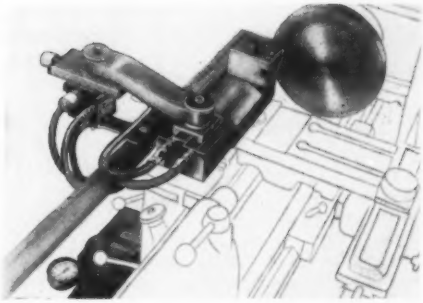
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For more data circle 586 on Postpaid Card

index to advertisements

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A. K. Tool Co., Inc. 268
Aaron Mchry. Co., Inc. 273, 275
Abrading Systems Co. 220
Ace Drill Bushing Co. 85
Acme Industrial Co. 21
Acme Tool Corp. 215
Acromark Co. 230
Adamas Carbide Corp. ..... Second Cover
Adjustable Clamp Co. 228
Aget Mfg. Co. 171
Airway Pump & Equipment Co. 224
Airetool Mfg. Co. 231
Allegheny Ludlum Steel Corp. 32
Allied Mfg. & Sales Co. 263
Allison-Campbell Div.,
American Chain & Cable Co., Inc. 28
Aloris Tool Co., Inc. 199
American Chain & Cable Co., Inc.,
Allison-Campbell Div. 28
Wilson Mechanical Instrument Div. .. 18, 173
American Drill Bushing Co., Inc. 65
American Saw & Mfg. Co. 93
American Sip Corp. 83
American Tool Wks. Co. 100
Anderson Bros. Mfg. Co. 165
Anton Machine Wks. 199, 233
Armco Steel Corp. 38
Armstrong-Blum Mfg. Co. 20
Armstrong Bros. Tool Co. 107
Atlas Press Co., Clausing Div. 90
Austin Industrial Corp. 56
Auto Moulding & Mfg. Co. 234
Avey Div., Motch &
Merryweather Mchry. Co. 74

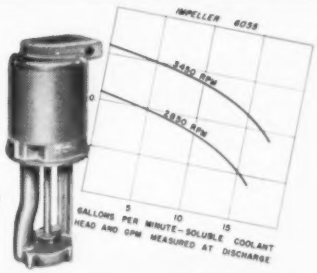
B & W Precision Products Co. 176
Babcock & Wilcox Co. 42
Backus Machine Wks. 192
Barker Engr. Co. 207
Barnes Drill Co. 159
Barry Controls, Inc. 174
Bausch & Lomb Optical Co. 31
Bay Products, inc. 254
Behr-Manning, Div. of Norton Co. 50
Bellows Co. 132
Benchmaster Mfg. Co. 202
Black Drill Co. 154
Blanchard Machine Co. 82
Boggis & Co., H. P. 251
Bokum Tool Co. ..... First Cover
Boyar-Schultz Corp. 24
Branch Mfg. Co. 224
Bremil Mfg. Co. 207
Brightboy Industrial Div.,
Weldon Roberts Rubber Co. 87
Brown & Sharpe Mfg. Co. 71
Buck Tool Co. 279
Bunting Brass & Bronze Co. 76
Busch Co., J. C. 223
Butterfield Div., Union Twist Drill Co. 88
Byco Industries 228

Capewell Mfg. Co. 229
Card Div., S. W., Union Twist Drill Co. 142
Carlton Machine Tool Co. 81
Chicago Mfg. & Dist. Co. 183
Chicago Quadrill Co. 141
Chicago Tool & Engr. Co. 197
Cincinnati Gilbert Machine Tool Co. 47
Cincinnati Lathe & Tool Co. 13
Cincinnati Milling Machine Co. 10, 11
Cincinnati Milling Machine Co.,
Cincinnati Milling Products Div. 41
Cincinnati Shaper Co. 30
Circular Tool Co. 157
Clark Co., Robt. H. 185, 201, 246, 252
Clausing Div., Atlas Press Co. 90
Clearing Div., U. S. Industries, Inc. ... 39, 204
Clemson Bros., Inc. 79
Clipper Diamond Tool Co., Inc. 164
Clover Mfg. Co. 271
Cogsdill Tool Products, Inc. 73
Commander Mfg. Co. 212
Comtor Co. 257
Cook's Lead Hammer Service 207
Covel Mfg. Co. 12
Crane Packing Co. 57
Criterion Machine Wks. 95

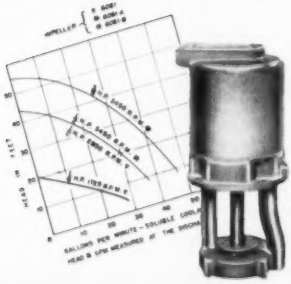
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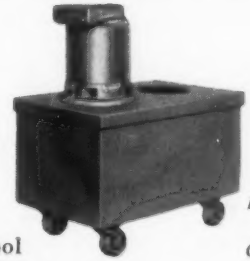
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Davis Keyseater Co. 216
Delta Power Tool Div.,
Rockwell Mfg. Co. 34, 35
Desmond-Stephan Mfg. Co. 163
DeVlieg Microbore,
Div. of DeVlieg Machine Co. 77
Dixie Tool Industries, Inc. 248
Dorden Mfg. Co. 242
Dreis & Krump Mfg. Co. 214
Dremel Mfg. Co. 226
duMont Corp. 64
Dumore Co. 151
Dunham Tool & Mfg. Co. 246
Dykem Co. 227

Eastern Centerless Grinding Co. 242
Eclipse Counterbore Co. 153
Economy Engr. Co. 198
Edroy Products Co. 213
Eisler Engr. Co., Inc. 239
Empire Tool Co. 137
Enco Mfg. Co. 211
Ettco Tool & Machine Co., Inc. 217
Ex-Cell-O Corp. 160

Fellows Gear Shaper Co. 16, 17
Field & Son, Inc., W. W. 227
Fiske Bros. Refining Co. 170
Flynn Mfg. Co. 215
Fosdick Machine Tool Co. 36, 37
Foster Supplies Co. 99
Fulflo Specialties Co., Inc. 60

Gallmeyer & Livingston Co. 7
Gatco Rotary Bushing Co. 239
Gisholt Machine Co. 14, 25
Grant Mfg. & Machine Co. 247
Graymills Corp. 236
Greaves Machine Tool Co. 27
Green Instrument Co. 68
Greenerd Arbor Presses 209
Greenlee Bros. & Co. 70

Hamilton Tool Co. 195
Hammond Mchry. Builders, Inc. 5
Hannifin Co., Div. of Parker-Hannifin Corp. 283
Heimann Mfg. Co. 245
Heinrich Tools, Inc. 169
Hill Acme Co. 84
Himoff Machine Co., Inc. 252
Holmes Gage & Development Corp. 185
Holo-Krome Screw Corp. ..... Fourth Cover
Homestrand, Inc. 277
Hones, Inc., Chas. A. 185
Huron Machine Products, Inc. 240

Ideal Industries, Inc. 208
Illinois Metal Products Co. 266
Index Industrial Corp. 271
Ingersoll Milling Machine Co. 48

J & S Tool Co., Inc. 33, 281
Jeon Mfg. Co. 251
Jiffy Mfg. Co. 201
Johnson Gas Appliance Co. 261
Johnson Machine & Press Corp. 236
Jones & Lamson Machine Co. 46

Kasenit Co. 241
Kenco Mfg. Co. 200
Kennametal, Inc. 92
Kidde Precision Tool Corp. 247, 262
Klaas Machine & Mfg. Co. 243

Laminated Shim Co., Inc. 264, 265
Landis Machine Co. 4
Lapeer Mfg. Co. 196
Lassy Tool Co. 181, 184, 199
Latrobe Steel Co. 22
LeBlond Machine Tool Co. 52, 53
Lewthwaite Machine Co., T. H. 203
Lexco Engr. & Mfg. Corp. 238
Lilly & Co., Eli 97
Linley Bros. Co. 233
Littell Machine Co., F. J. 210
Lockformer Co. 75
Lodge & Shipley Co. ..... Third Cover
Logan Engr. Co. 19
Lucas & Son, Inc., J. L. 158
Lucifer Furnaces, Inc. 203

Machine Products Corp. 249
Madison-Faessler Tool Co. 15
Mahr Gage Co. 269
Main & Sons, Inc., Robt. 201
Marshall Steel Co. 175
Matthews & Co., J. H. 78
Mattison Machine Works 40
McDonough Mfg. Co. 219
Midwest Tool & Engr. Co. 215
Miller Fluid Power Div.,
Flick-Reedy Corp. 167
Modern Machine Tool Co. 89
Mossberg, Inc. 205
Mummert-Dixon Co. 209

National Acme Co. 44, 45
National-Detroit, Inc. 206
Nebel Machine Tool Co.,
Smith & Mills Shaper Div. 59
Needham, Earl H. 103
Neise, Karl A. 181, 255
New Method Steel Stamps, Inc. 253
Newage Industries, Inc. 185
Nicholson File Co. 147
Nielsen, Inc. 201
Nielsen Tool & Die Co. 247
Nilson Machine Co., A. H. 221
Noble & Westbrook Mfg. Co. 86
Nobur Mfg. Co. 238
Northwestern Tools, Inc. 177
Norton Co. 61, 66, 67
Numberall Stamp & Tool Co. 259
Nu-Tangs, Inc. 248

O. K. Tool Co., Inc. 8
Oliver Instrument Co. 26
O'Neil-Irwin Mfg. Co. 133
Osborn Mfg. Co. 58
Ottemiller Co., Wm. H. 203

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Pannier Corp. 239
Parker-Hannifin Corp., Hannifin Co. Div. .. 283
Parks Woodworking Machine Co. 209
Peaslee Metal Products, Inc. 240
Pedrick Tool & Machine Co. 72
Pemco Perforators Co. 241
Perkins Gear & Machine Co. 161
Pines Engr. Co., Inc. 54
Pope Mchry. Corp. 23
Porter Machine Co. 241
Preis Engraving Machine Co., H. P. 181
Procunier Safety Chuck Co. 270

Queen City Machine Tool Co. 136

Raymond Mfg. Co. 172
Reading Machine Co. 262
Reich Mfg. Co., J. R. 250
Reliance Tool & Mfg. Co. 184
Reid Tool Supply Co. 268
Retco Mfg. & Sales 245
Retor Developments, Ltd. 285
Richards Co., J. A. 246
Rico Tool Co. 241
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Rockford Machine Tool Co. 51
Rodgers Hydraulic, Inc. 62
Rota File Corp. 250

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Rothfuss Tool Co. 205
Rowbottom Machine Co. 205
Ruthman Mchry. Co. 287

Sales Service Machine Tool Co. 258
Sanford Mfg. Corp. 98
Savage Co., W. J. 243
Scherr Co., Inc., Geo. 225
Schmidt, Inc., Geo. T. 228
Schupack Supply Co. 290
Seibert & Sons, Inc. 168
Sentry Co. 291
Service Machine Co. 140
Sheldon Machine Co., Inc. 193
Silber Products, Inc. 223
Smith & Mills Shaper Div., Nebel Machine Tool Co. 59
Sonnet Tool & Mfg. Co. 289
Spartan Saw Wks., Inc. 237
Spellman Co., R. L. 249
Springfield Machine Tool Co. 49
Standard Electrical Tool Co. 292
Standard Horse Nail Corp. 194
Standard Steel Specialty Co. 252
Stevens, Inc., J. B. 250
Sundstrand Machine Tool Co. 29
Super Tool Co. 63
Sutton Tool Co. 105
Syntron Co. 80

Teeter, C. B. 158
Thompson Grinder Co. 149
Thriftmaster Products Corp. 235
Titan Tool Supply Co. 242
Tomkins-Johnson Co. 69
Torit Mfg. Co. 218
Trico Fuse Mfg. Co. 222
Twentieth Century Mfg. Co. 225

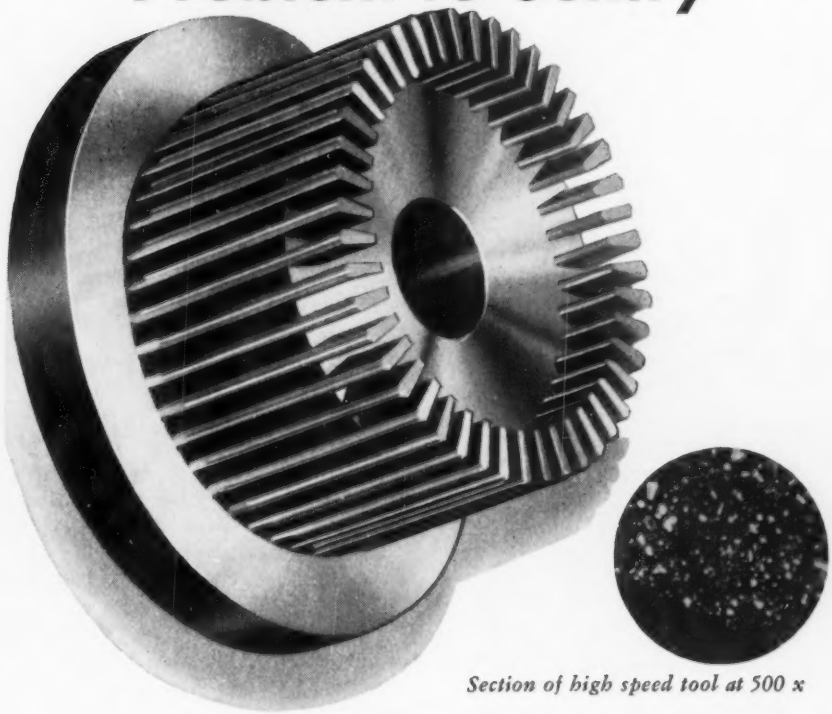
Union Twist Drill Co. 143
Universal Engr. Co. 55
Universal Hose Co. 205

Vascoloy-Ramet Corp. 7
Vermont Flexible Tubing Co. 249
Victor Mchry. Exchange, Inc. 267
Vogel Tool & Die Corp. 179

Wade Tool Co. 6
Walker-Turner Div., Rockwell Mfg. Co. 43
Wallace Supplies Mfg. Co. 256
Walton Co. 207
Wardwell Mfg. Co. 184
Watts Bros. Tool Wks. 248
Wells Mfg. Corp. 180
West Chemical Products Co. 155
Wheelock, Lovejoy & Co. 178
Whistler & Sons, Inc., S. B. 94
Willey's Carbide Tool Co. 272
Wilson Air Collet Closer, Inc. 234
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc. .. 18, 173

Yoder Co. 96

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EDITORIAL ITEMS

1	26	51	76	101	126	151	176
2	27	52	77	102	127	152	177
3	28	53	78	103	128	153	178
4	29	54	79	104	129	154	179
5	30	55	80	105	130	155	180
6	31	56	81	106	131	156	181
7	32	57	82	107	132	157	182
8	33	58	83	108	133	158	183
9	34	59	84	109	134	159	184
10	35	60	85	110	135	160	185
11	36	61	86	111	136	161	186
12	37	62	87	112	137	162	187
13	38	63	88	113	138	163	188
14	39	64	89	114	139	164	189
15	40	65	90	115	140	165	190
16	41	66	91	116	141	166	191
17	42	67	92	117	142	167	192
18	43	68	93	118	143	168	193
19	44	69	94	119	144	169	194
20	45	70	95	120	145	170	195
21	46	71	96	121	146	171	196
22	47	72	97	122	147	172	197
23	48	73	98	123	148	173	198
24	49	74	99	124	149	174	199
25	50	75	100	125	150	175	200

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301—Front Cover					410	435	460	485	510	535	560	585	610
302—Inside Front Cover					411	436	461	486	511	536	561	586	611
303—Inside Back Cover					412	437	462	487	512	537	562	587	612
304—Back Cover					413	438	463	488	513	538	563	588	613
305	326	347	368	389	414	439	464	489	514	539	564	589	614
306	327	348	369	390	415	440	465	490	515	540	565	590	615
307	328	349	370	391	416	441	466	491	516	541	566	591	616
308	329	350	371	392	417	442	467	492	517	542	567	592	617
309	330	351	372	393	418	443	468	493	518	543	568	593	618
310	331	352	373	394	419	444	469	494	519	544	569	594	619
311	332	353	374	395	420	445	470	495	520	545	570	595	620
312	333	354	375	396	421	446	471	496	521	546	571	596	621
313	334	355	376	397	422	447	472	497	522	547	572	597	622
314	335	356	377	398	423	448	473	498	523	548	573	598	623
315	336	357	378	399	424	449	474	499	524	549	574	599	624
316	337	358	379	400	425	450	475	500	525	550	575	600	625
317	338	359	380	401	426	451	476	501	526	551	576	601	626
318	339	360	381	402	427	452	477	502	527	552	577	602	627
319	340	361	382	403	428	453	478	503	528	553	578	603	628
320	341	362	383	404	429	454	479	504	529	554	579	604	629
321	342	363	384	405	430	455	480	505	530	555	580	605	630
322	343	364	385	406	431	456	481	506	531	556	581	606	631
323	344	365	386	407	432	457	482	507	532	557	582	607	632
324	345	366	387	408	433	458	483	508	533	558	583	608	633
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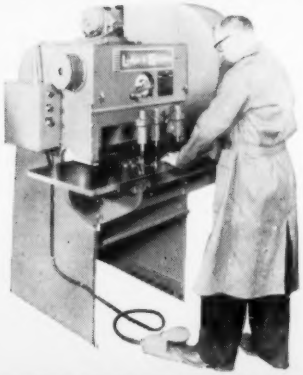
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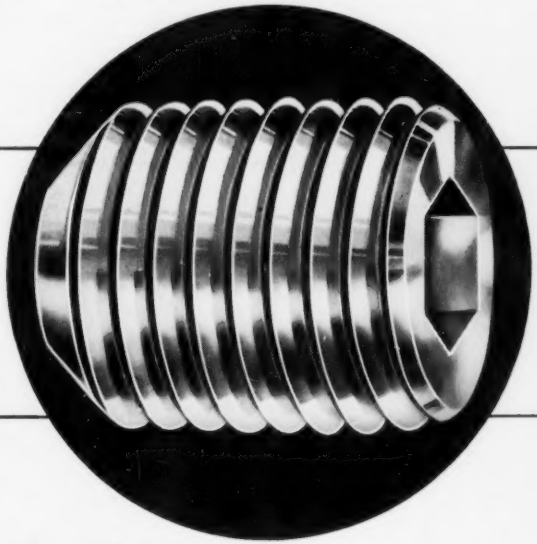
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